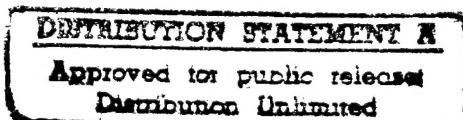


9127-07.01

**ROCKY MOUNTAIN ARSENAL  
NORTHWEST BOUNDARY CONTAINMENT/TREATMENT SYSTEM  
OPERATIONAL ASSESSMENT REPORT**

**FY89**

**FINAL REPORT**



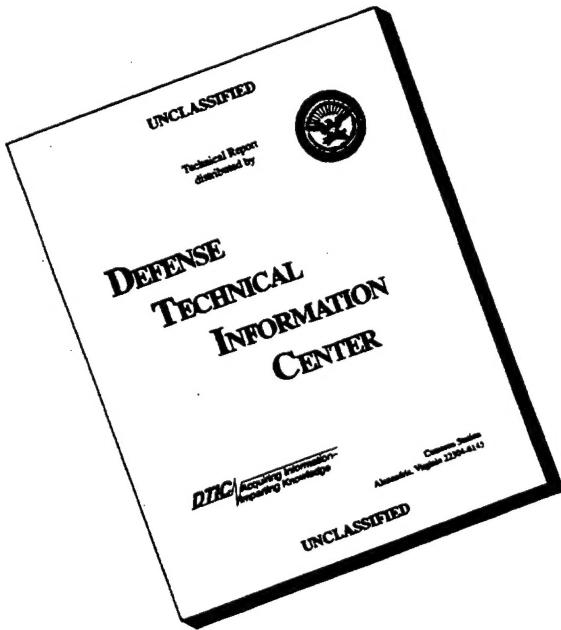
**BY**

**TECHNICAL OPERATIONS DIVISION  
PROGRAM MANAGER, ROCKY MOUNTAIN ARSENAL  
COMMERCE CITY, COLORADO 80022-2180**

**AUGUST 1990**

**19960826 164**

# **DISCLAIMER NOTICE**



**THIS DOCUMENT IS BEST  
QUALITY AVAILABLE. THE  
COPY FURNISHED TO DTIC  
CONTAINED A SIGNIFICANT  
NUMBER OF PAGES WHICH DO  
NOT REPRODUCE LEGIBLY.**

## PREFACE

This study was conducted as part of a cooperative effort by personnel from the Technical Operations Division (TOD) of the Program Manager for Rocky Mountain Arsenal (PMRMA) and the U.S. Army Engineer Waterways Experiment Station (WES). Funding for participation by WES was provided by the PMRMA via Intra-Army Order No. 0090. Project management was provided by Messrs. David W. Strang, TOD, Norman R. Francingues, WES Environmental Laboratory (EL) and James H. May, WES Geotechnical Laboratory (GL).

This study is the fourth operational assessment of the Northwest Boundary Containment/Treatment System at Rocky Mountain Arsenal (RMA). The contributing authors to this report were Messrs. Jack H. Dildine, Douglas W. Thompson, Norman R. Francingues (WES-EL), Richard J. Lutton, and John B. Palmerton (WES-GL). The study and report were authorized by the Program Manager for Rocky Mountain Arsenal.

The authors acknowledge the support and assistance of the following people and organizations during this study: Ms. Dianna Pantleo and Ms. Tina Nowlin, D. P. Associates, and Ms. Tommie Ann Gard of A.S.K., Associates.

## CONTENTS

|  | <u>Page</u> |
|--|-------------|
| PREFACE . . . . .  | 1           |
| PART I: INTRODUCTION . . . . .   | 5           |
| Background . . . . .   | 5           |
| Report Objective . . . . .   | 7           |
| Approach . . . . .   | 7           |
| PART II: PLANT OPERATIONS MONITORING . . . . .   | 8           |
| PART III: SYSTEM OPERATIONS . . . . .  | 11          |
| Operations Summary . . . . .   | 11          |
| System Flow Quantities . . . . .   | 11          |
| System Influent and Effluent Water Quality . . . . .   | 14          |
| Contaminant Mass Removal . . . . .   | 31          |
| Carbon Usage . . . . .   | 32          |
| Contaminant Concentrations in Dewatering Wells . . . . .   | 32          |
| PART IV: GROUND-WATER FLOW EVALUATION . . . . .  | 45          |
| Geology and Hydrogeology . . . . .   | 45          |
| Ground-Water Hydrology . . . . .   | 49          |
| Recharge Function . . . . .  | 56          |
| PART V: CONCLUSIONS . . . . .  | 57          |
| REFERENCES . . . . .   | 58          |
| APPENDIX A: FLOW DATA . . . . .  | A1          |
| APPENDIX B: TREATMENT PLANT WATER QUALITY<br>DATA STATISTICAL SUMMARY AND GC/MS ANALYSIS . . . . . | B1          |
| APPENDIX C: DEWATERING WELL DATA . . . . .   | C1          |
| APPENDIX D: NORTHWEST BOUNDARY SYSTEM DOWNTIME . . . . .   | D1          |

## LIST OF TABLES

| No. |   | Page |
|-----|---|------|
| 1   | Chemical Analysis of Treatment Plant Samples . . . . .                | 9    |
| 2   | Northwest Boundary System Treatment Plant Downtime for FY89 . . . . . | 11   |
| 3   | FY89 System Flow Quantities . . . . .                                 | 14   |
| 4   | Maximum Operating Limits for Northwest Boundary Systems . . . . .     | 16   |
| 5   | Northwest Boundary System Contaminant Removal for FY89 . . . . .      | 32   |

## LIST OF FIGURES

| No. |   | Page |
|-----|---|------|
| 1   | Northwest Boundary Containment/Treatment System layout map . . . . .                          | 6    |
| 2   | Adsorber 1 flow rate during FY89 . . . . .  | 12   |
| 3   | Adsorber 2 flow rate during FY89 . . . . .  | 12   |
| 4   | Adsorber 3 flow rate during FY89 . . . . .  | 13   |
| 5   | Effluent flow rate during FY89 . . . . .  | 13   |
| 6   | FY89 Aldrin concentration . . . . .   | 17   |
| 7   | FY89 Chloride Concentration . . . . .   | 18   |
| 8   | FY89 Chloroform (CHCL3) concentrations . . . . .  | 20   |
| 9   | FY89 Diisopropylmethylphosphonate (DIMP) concentrations . . . . .                             | 21   |
| 10  | FY89 Dieldrin concentrations . . . . .  | 22   |
| 11  | FY89 Endrin concentrations . . . . .  | 23   |
| 12  | FY89 Fluoride concentrations . . . . .  | 24   |
| 13  | FY89 Isodrin concentrations . . . . .   | 26   |
| 14  | FY89 Parathion concentrations . . . . .   | 27   |
| 15  | FY89 Sulfate (SO4) concentrations . . . . .   | 28   |
| 16  | FY89 Tetrachloroethylene (TCLEE) concentrations . . . . .                                     | 29   |
| 17  | FY89 Trichloroethylene (TRCLE) concentrations . . . . .                                       | 30   |
| 18  | FY89 Aldrin concentrations in NWBS dewatering wells . . . . .                                 | 33   |
| 19  | FY89 Chloride concentrations in NWBS dewatering wells . . . . .                               | 35   |
| 20  | FY89 Dicyclopentadiene (DCPD) concentration in NWBS<br>dewatering wells . . . . .             | 36   |
| 21  | FY89 Diisopropylmethylphosphonate (DIMP) concentrations in<br>NWBS dewatering wells . . . . . | 38   |
| 22  | FY89 Dieldrin concentrations in NWBS dewatering wells . . . . .                               | 39   |
| 23  | FY89 Endrin concentrations in NWBS dewatering wells . . . . .                                 | 40   |
| 24  | FY89 Fluoride concentrations in NWBS dewatering wells . . . . .                               | 41   |
| 25  | FY89 Isodrin concentrations in NWBS dewatering wells . . . . .                                | 43   |
| 26  | FY89 Trichloroethylene (TRCLE) concentration in NWBS<br>dewatering wells . . . . .            | 44   |
| 27  | Water-table configuration (ft) at start of FY 89 . . . . .                                    | 46   |
| 28  | Water-table configuration (ft) at end of FY 89 . . . . .                                      | 47   |
| 29  | Water-table difference (ft) between start and end of FY 89 . . . . .                          | 48   |
| 30  | Location of water-table profiles . . . . .  | 50   |
| 31  | Profile I for FY 89 . . . . .   | 51   |
| 32  | Profile II for FY 89 . . . . .  | 52   |
| 33  | Profile III for FY 89 . . . . .   | 53   |
| 34  | Profile IV for FY 89 . . . . .  | 54   |
| 35  | Comparison of ground-water levels . . . . .   | 55   |

CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI)  
UNITS OF MEASUREMENT

U.S. customary units of measurement used in this report can be converted to metric (SI) units as follows.

| Multiply   | By         | To Obtain                 |
|--|------------|---------------------------|
| acre   | 4046.873   | square metres             |
| cubic feet   | 0.02831685 | cubic metres              |
| feet   | 0.3048     | metres                    |
| feet per mile (U.S. statute)                       | 0.1893936  | metres per kilometre      |
| gallons (U.S. liquid)                              | 3.785412   | cubic decimetres          |
| horsepower (550 foot-pounds<br>(force) per second) | 745.6999   | watts                     |
| inches   | 2.54       | centimetres               |
| miles (U.S. statute)                               | 1.609347   | kilometres                |
| pounds (mass) per cubic foot                       | 16.01846   | kilograms per cubic metre |
| square feet  | 0.09290304 | square metres             |
| square miles                                       | 2.589998   | square kilometres         |

NORTHWEST BOUNDARY CONTAINMENT/TREATMENT SYSTEM

OPERATIONAL ASSESSMENT REPORT FY89

PART I: INTRODUCTION

Background

1. The Northwest Boundary Containment/Treatment System\* Operational Assessment described herein has been prepared to document and evaluate the performance related to the boundary system operations. This report covers the system operating period of FY89.

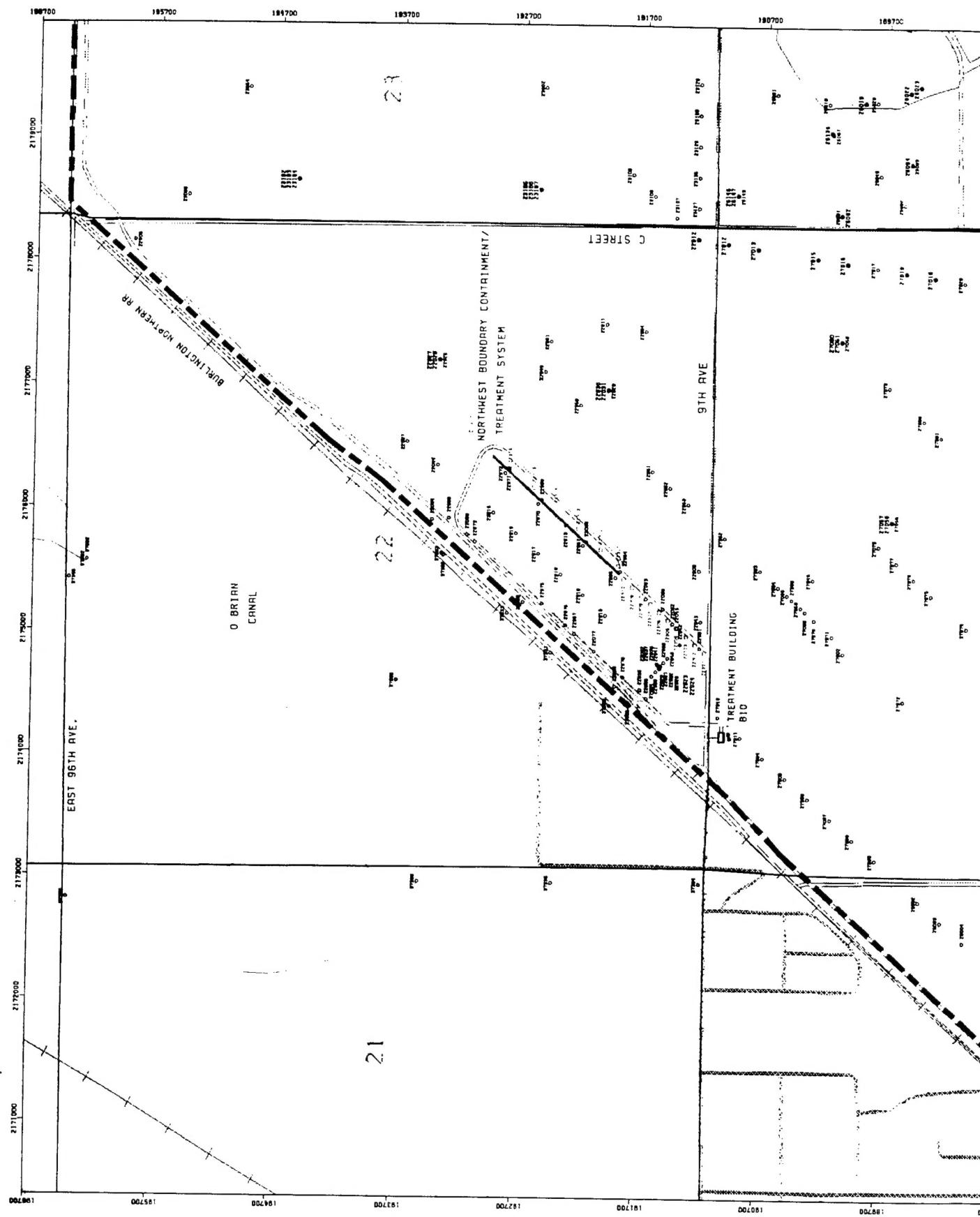
2. Ground-water contamination problems have existed in the area of the Northwest boundary of Rocky Mountain Arsenal (RMA) since the mid 1950's, when investigations were conducted by the Army Corps of Engineers. In 1975, a ground-water surveillance program for RMA was established. This regional surveillance task included the monitoring of wells in the arsenal boundary areas. Since that time, several problem definition studies and design investigations have been conducted by RMA and the Corps of Engineers. Subsequently, a ground-water surveillance program was initiated in 1978 specifically for the Northwest boundary.

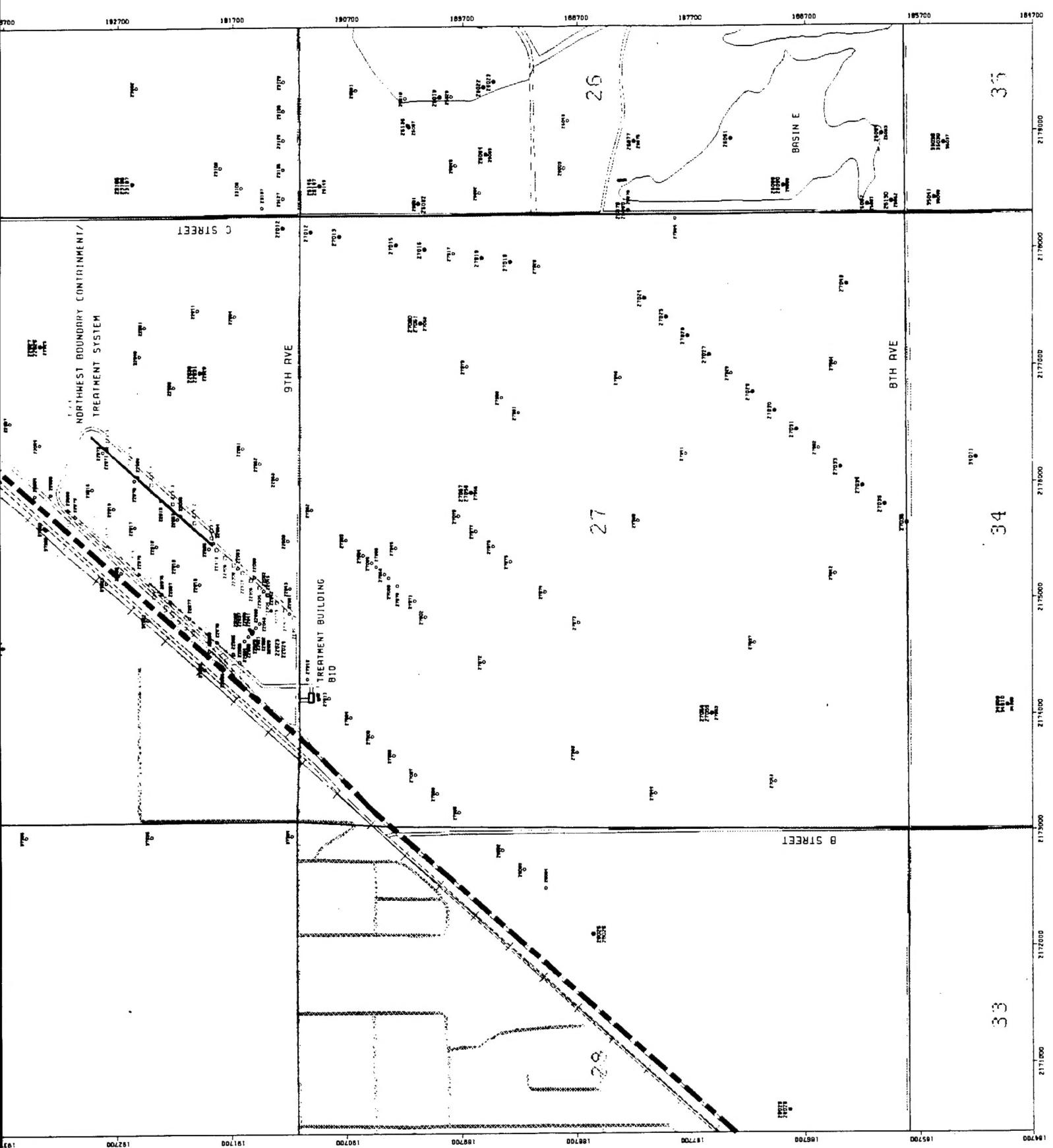
3. As a result of the ground-water investigations in 1980, several contaminants including DIMP, DBCP, chloride, endrin and dieldrin were detected in a narrow plume of ground water leaving RMA to the north and northwest. Additional studies by RMA and the Corps of Engineers lead to the design and construction of the Northwest Boundary Containment/Treatment System (NWBS) that was completed in October 1984 (Figure 1). This was the third boundary ground-water contamination control system constructed and operated at RMA.

4. This report incorporates by reference major system descriptions and previous operations described in the report entitled "Northwest Boundary Containment/Treatment System Baseline Conditions, System Startup and Operational Assessment Report for FY85/86" (PMRMA 1987). The reader is referred to the basic report for detailed information concerning a complete physical description of the system. The basic report is catalogued at the Rocky Mountain Arsenal Information Center (RIC) library and is document number 88054R01.

---

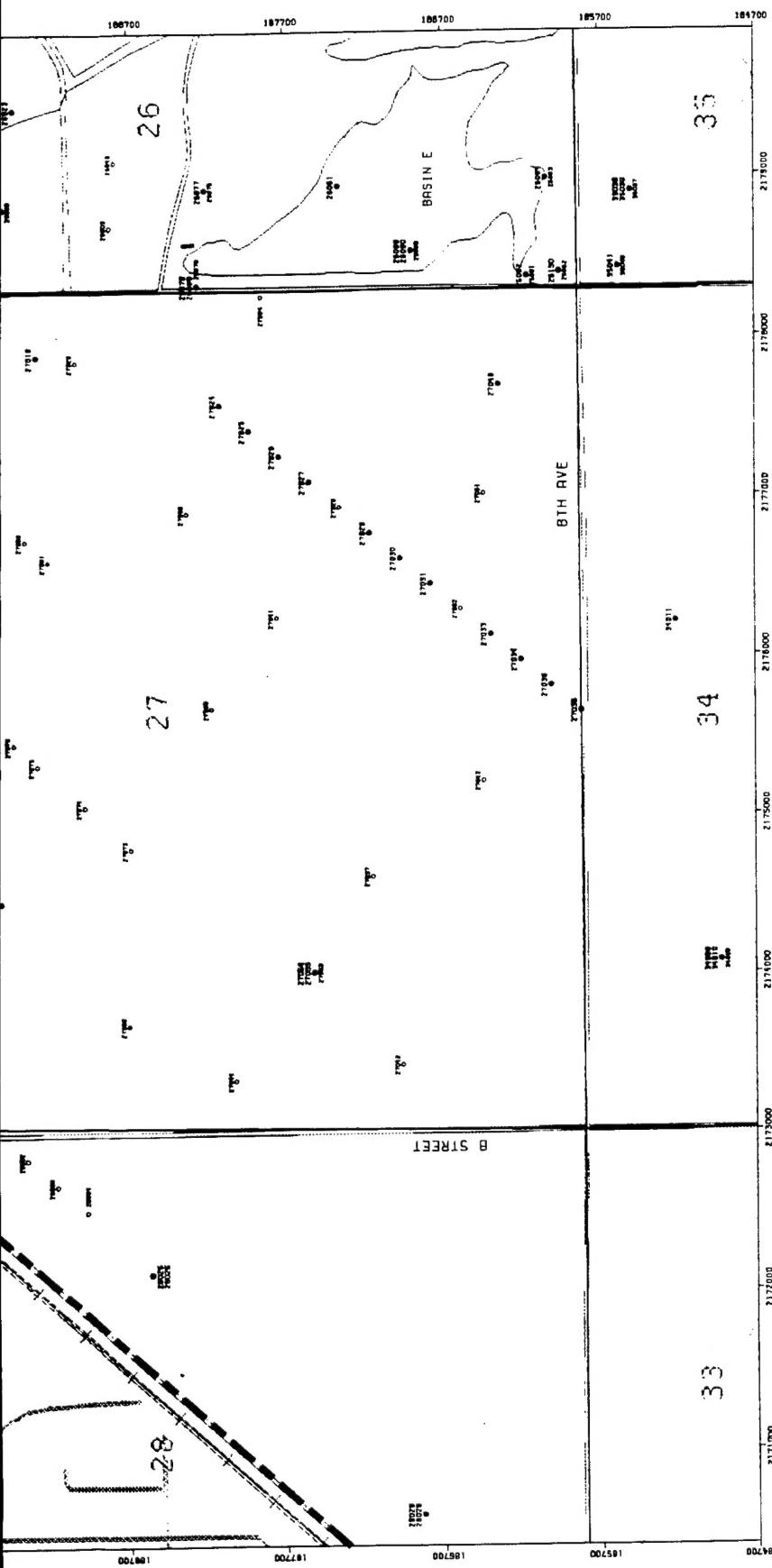
\* Hereinafter referred to as Northwest Boundary System.





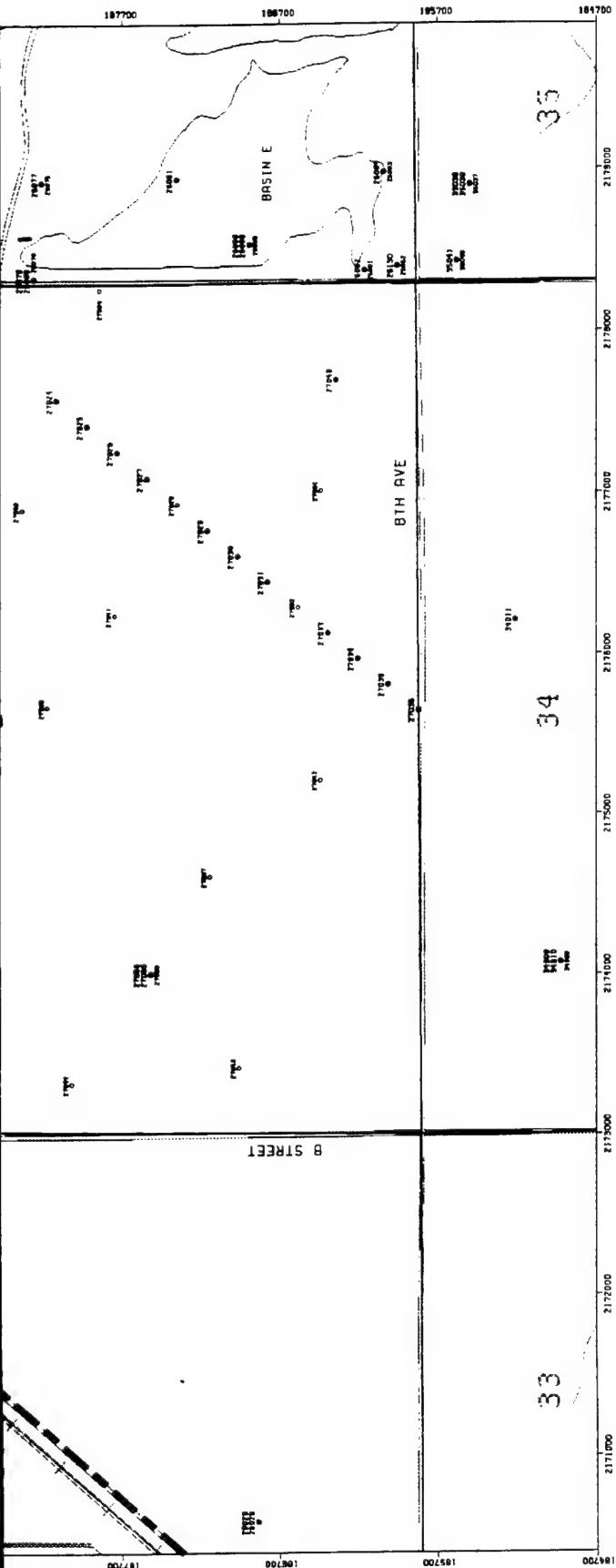
LEGEND

- Alluvial Monitoring Wells
- Denver Monitoring Wells
- Downstream Wells
- Piezometers
- Recharge Wells
- Drainage
- Road
- Structure
- Trench
- Sherry Wall
- Arsenal Boundary



0 800  
SCALE IN FEET

| SYN                                    | DESCRIPTION                                     | DATE APPROV        |
|--|---|--------------------|
| REVISONS                               |   |                    |
| DEPARTMENT OF THE ARMY                 |   |                    |
| ROCKY MOUNTAIN ARSENAL - DENVER, COLO. |   |                    |
| DRAWN BY AS - 11                       | Northwest Boundary Containment/Treatment System |                    |
| DATE OCTOBER, 1980                     |   |                    |
| CHECKED BY                             |   |                    |
| REVIEWED                               |   |                    |
| FILED NAME                             |   |                    |
| OF ASSOCIATES, MARTINSVILLE, VA        | TENTINE, DENVER, COLORADO                       |                    |
| CONTRACTOR                             | SUB CONTRACTOR                                  | ENGINEERING OFFICE |
| ROCKY MOUNTAIN ARSENAL                 | SH  | SCRE               |
| DUSTBANE MANAGEMENT CONTRACT           | OK  | DATE               |



#### **LEGEND**

- Alluvial Monitoring Wells
- Denver Monitoring Wells
- Dewatering Wells
- Piezometers
- Recharge Wells
- Drainage
- Road
- Structure
- French
- Slurry Wall
- Arsenic Boundary



500 0 500  
SCALE IN FEET

|  |   |                    |          |
|--|---|--------------------|----------|
| SYN  | DESCRIPTION                                     | DATE               | APPROVED |
|  | REVISIONS                                       |                    |          |
| <b>DEPARTMENT OF THE ARMY<br/>ROCKY MOUNTAIN ARSENAL - DENVER, COLO.</b> |   |                    |          |
| DRAWN BY : LS - T  | Northwest Boundary Containment/Treatment System |                    |          |
| DATE OCTOBER, 1980   |   |                    |          |
| CHECKED BY   |   |                    |          |
| REVIEWED   |   |                    |          |
| FILED/MRNC   |   |                    |          |
| NP ASSOCIATES, BARTSVILLE, AL  | TENTING, DENVER, COLORADO                       |                    |          |
| CONTRACTOR   | SUB CONTRACTOR                                  | ENGINEERING OFFICE |          |
| ROCKY MOUNTAIN ARSENAL<br>GATEHOUSE MAINTENANCE CONTRACT                 | SH  | SCALE              | DATE     |
|  | OF  |                    |          |

Report Objective

5. The objective of this report is to document the system operating parameters and performance during FY89, and, to identify and document any system improvements and facility alterations implemented during FY89.

Approach

6. The Technical Operations Division (TOD) at RMA provided the data base and general technical guidance. The U.S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi, provided specialized environmental engineering assessments.

7. The study was conducted in three phases. Data were retrieved and organized by the TOD and RIC. The data bases were reviewed by WES for completeness prior to conducting various system performance evaluations. During the course of study, several in-progress reviews and coordination working sessions were held at the RMA, to facilitate exchange of information and to assure continuity and consistency in data interpretations and evaluations. Finally, the report was assembled from individual sections prepared by the various contributing authors.

## PART II: PLANT OPERATIONS MONITORING

8. The treatment plant monitoring program continued in FY89. It included collection of data on flow rates through the system, and the quality of the water entering and leaving the plant. The flow rates were recorded on a daily basis.

9. Samples were taken weekly from the interior of the adsorbers for process control. These data were used to determine when (if necessary) to change carbon within the adsorber. The qualities of the plant's influent and effluent waters were monitored by taking water samples on a weekly basis and analyzing them. Samples were also collected from the dewatering wells and analyzed. These samples were collected from ports located in the well pits.

10. All water samples were collected in previously cleaned, glass containers, sealed, and transported to the appropriate analytical laboratory at RMA or their contractor for analysis. The parameters for which the plant samples were analyzed for during FY89 are presented in Table 1. All analyses were performed using standard methods. The sample analysis and flow data were entered into the analytical data base by laboratory personnel, subjected to a quality control routine, validated, and placed into the PMRMA data base by the RIC. Data sets were prepared for use in developing tables and figures. Copies of the plant flow, analytical data and NWBS downtime for FY89 are contained in Appendices A, B, C, and D of this report.

Table 1  
Chemical Analysis of Treatment Plant Samples

| Analyte   | FY89 Quarters |            |            |            |
|---|---------------|------------|------------|------------|
|   | <u>1st</u>    | <u>2nd</u> | <u>3rd</u> | <u>4th</u> |
| <u>Organochlorine Pesticides</u>                      |               |            |            |            |
| Aldrin  | X             | X          | X          | X          |
| Endrin  | X             | X          | X          | X          |
| Dieldrin  | X             | X          | X          | X          |
| Isodrin   | X             | X          | X          | X          |
| Hexachlorocyclopentadiene                             |               | X          | X          |            |
| p,p'-DDE  |               | X          | X          |            |
| p,p'-DDT  |               | X          | X          |            |
| Chlordane   |               | X          | X          |            |
| <u>Volatile Organohalogens</u>                        |               |            |            |            |
| Chlorobenzene   |               | X          | X          |            |
| Chloroform  |               | X          | X          |            |
| Carbon Tetrachloride                                  |               | X          | X          |            |
| Trichloroethylene (TCE)                               | X             | X          | X          | X          |
| Tetrachloroethylene                                   |               | X          | X          |            |
| 1,1 Dichloroethylene                                  |               | X          | X          |            |
| 1,1 Dichloroethane                                    |               | X          | X          |            |
| 1,2 Dichloroethane                                    |               | X          | X          |            |
| 1,1,1 Trichloroethane                                 |               | X          | X          |            |
| 1,1,2 Trichloroethane                                 |               | X          | X          |            |
| Methylene Chloride                                    |               | X          | X          |            |
| 1,2 Dichloroethylene                                  |               | X          | X          |            |
| <u>Organosulfur Compounds</u>                         |               |            |            |            |
| P-Chlorophenylmethylsulfone<br>(PCPMSO <sub>2</sub> ) | X             | X          | X          | X          |
| P-Chlorophenylmethylsulfoxide<br>(PCPMSO)             | X             | X          | X          | X          |
| P-Chlorophenylmethylsulfide<br>(PCPMS)                | X             | X          | X          | X          |
| 1,4-Dithiane  | X             | X          | X          | X          |
| 1,4-Oxathiane   | X             | X          | X          | X          |
| Dimethyl disulfide (DMDS)                             |               | X          | X          |            |
| Benzothiazole   |               | X          | X          |            |
| <u>NP-Pesticides</u>                                  |               |            |            |            |
| Vapona  |               | X          |            |            |
| Supona  |               | X          |            |            |
| Atrazine  |               | X          |            |            |
| Malathion   |               | X          |            |            |
| Parathion   |               | X          | X          |            |

(Continued)

Table 1 (Concluded)

| <u>Analyte</u>               | <u>FY89 Quarters</u> |            |            |            |
|------------------------------|----------------------|------------|------------|------------|
|                              | <u>1st</u>           | <u>2nd</u> | <u>3rd</u> | <u>4th</u> |
| <u>DCPD/MIBK</u>             |                      |            |            |            |
| Dicyclopentadiene            | X                    | X          | X          | X          |
| Methylisobutylketone         |                      | X          | X          |            |
| Bicycloheptadiene            |                      |            | X          |            |
| <u>DIMP/DMMP</u>             |                      |            |            |            |
| Diisopropylmethylphosphonate | X                    | X          | X          | X          |
| Dimethylmethylphosphonate    |                      | X          | X          |            |
| <u>DBCP</u>                  |                      |            |            |            |
| Dibromochloropropane         | X                    | X          | X          | X          |
| <u>Inorganics</u>            |                      |            |            |            |
| Arsenic                      |                      | X          | X          |            |
| Chloride                     | X                    | X          | X          | X          |
| Fluoride                     | X                    | X          | X          | X          |
| Sulfate                      |                      | X          | X          |            |
| Alkalinity                   |                      |            |            |            |
| Calcium                      |                      |            |            |            |
| Cadmium                      |                      |            |            |            |
| Chromium                     |                      |            |            |            |
| Copper                       |                      |            |            |            |
| Cyanide                      |                      |            |            |            |
| Mercury                      |                      |            |            |            |
| Magnesium                    |                      |            |            |            |
| Potassium                    |                      |            |            |            |
| Sodium                       |                      |            |            |            |
| Combined (Nitrate/Nitrates)  |                      |            |            |            |
| Lead                         |                      |            |            |            |
| Zinc                         |                      |            |            |            |
| <u>Volatile Aromatics</u>    |                      |            |            |            |
| Toluene                      |                      | X          | X          |            |
| Benzene                      |                      | X          | X          |            |
| Xylene (o-, m-, p-)          |                      | X          | X          |            |
| Ethylbenzene                 |                      | X          | X          |            |
| 1,3 Dimethylbenzene          |                      | X          | X          |            |
| <u>GC/MS Analysis</u>        |                      |            |            |            |
|                              |                      |            | X          |            |

## PART III: SYSTEM OPERATIONS

### Operations Summary

11. A record of plant operations for the NWBS is maintained by RMA plant operating personnel with major events documented on a daily basis. The daily record contains information on the operations, maintenance activities, and repair of the treatment plant equipment and dewatering and recharge wells. The record also details other events such as plant downtime, equipment failure, and filter and carbon removal and replacement.

12. The performance of the Northwest Boundary System was very good during FY89 with minimal downtime being reported. The NWBS was never totally out of operation for more than 5.25 consecutive hours during the year. A summary of the downtime for each adsorber by quarter is presented in Table 2. Details on each downtime event are presented in Appendix D. The majority of the downtime was associated with leaks and plugged lines. As indicated in Table 2, no downtime was reported for the third and fourth quarters of FY89. There were no major physical alterations to the NWBS during FY89.

Table 2  
Northwest Boundary System Treatment Plant  
Downtime for FY89

| <u>Adsorber</u> | FY89 Quarter    |                 |                 |                 | Total |
|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
|                 | <u>1st(hrs)</u> | <u>2nd(hrs)</u> | <u>3rd(hrs)</u> | <u>4th(hrs)</u> |       |
| V101            | 0.0             | 13.4            | 0.0             | 0.0             | 13.4  |
| V102            | 25.8            | 20.7            | 0.0             | 0.0             | 46.5  |
| V103            | 0.0             | 23.5            | 0.0             | 0.0             | 23.5  |
| Plant           | 5.5             | 0.0             | 0.0             | 0.0             | 5.5   |

### System Flow Quantities

13. The volume of water processed by the NWBS is recorded on a daily basis. The flow data recorded for FY89 are presented in tables in Appendix A of this report. Graphs of weekly flow data for each adsorber and the effluent have been prepared and are presented in Figures 2 through 5. The treatment

AVERAGE GALLONS PER MINUTE

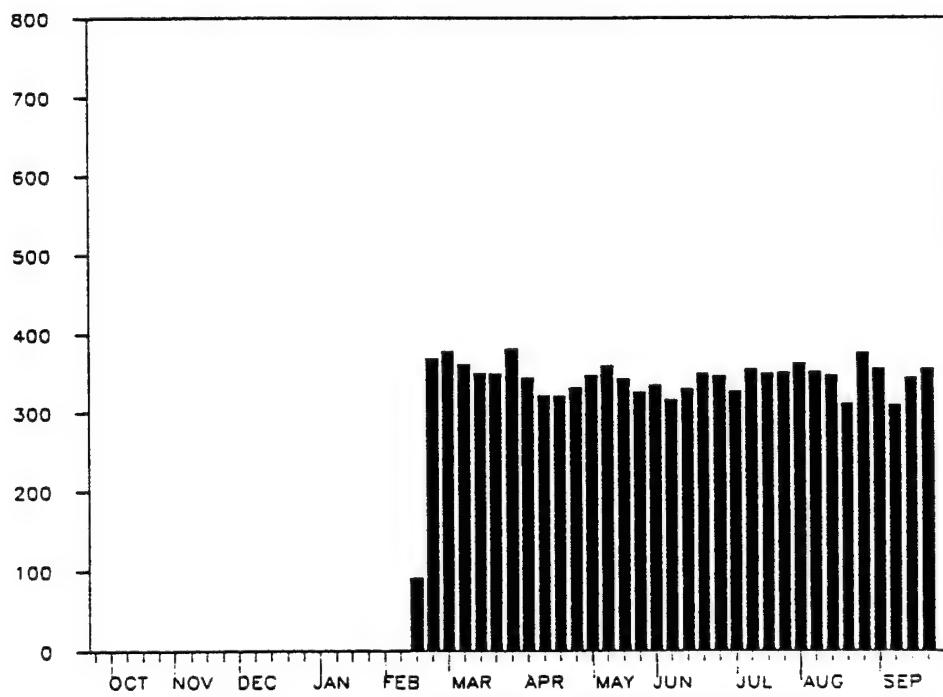


Figure 2. Adsorber 1 flow rate during FY89

AVERAGE GALLONS PER MINUTE

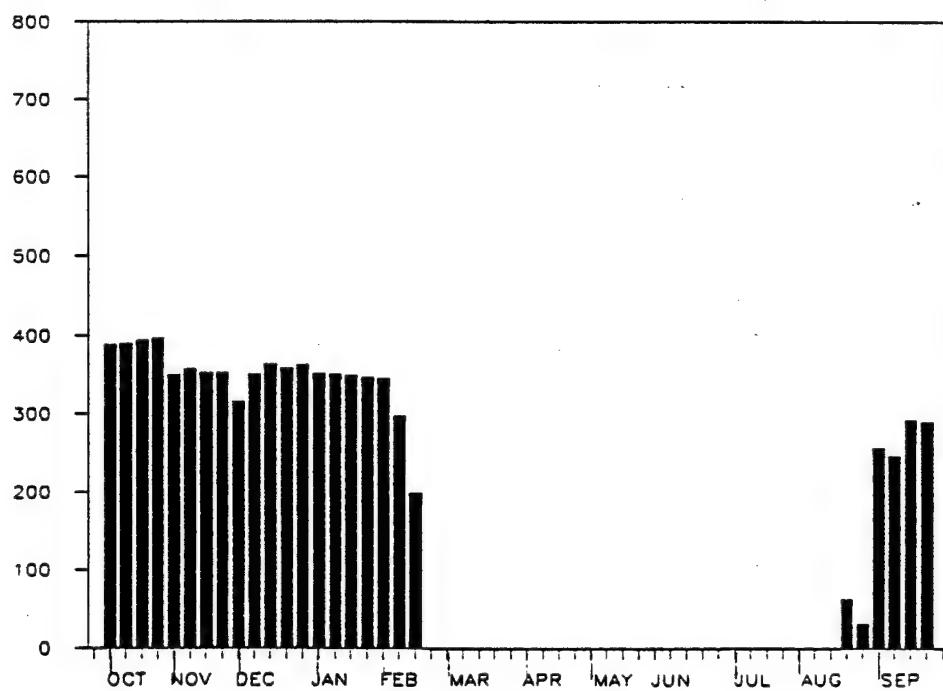


Figure 3. Adsorber 2 flow rate during FY89

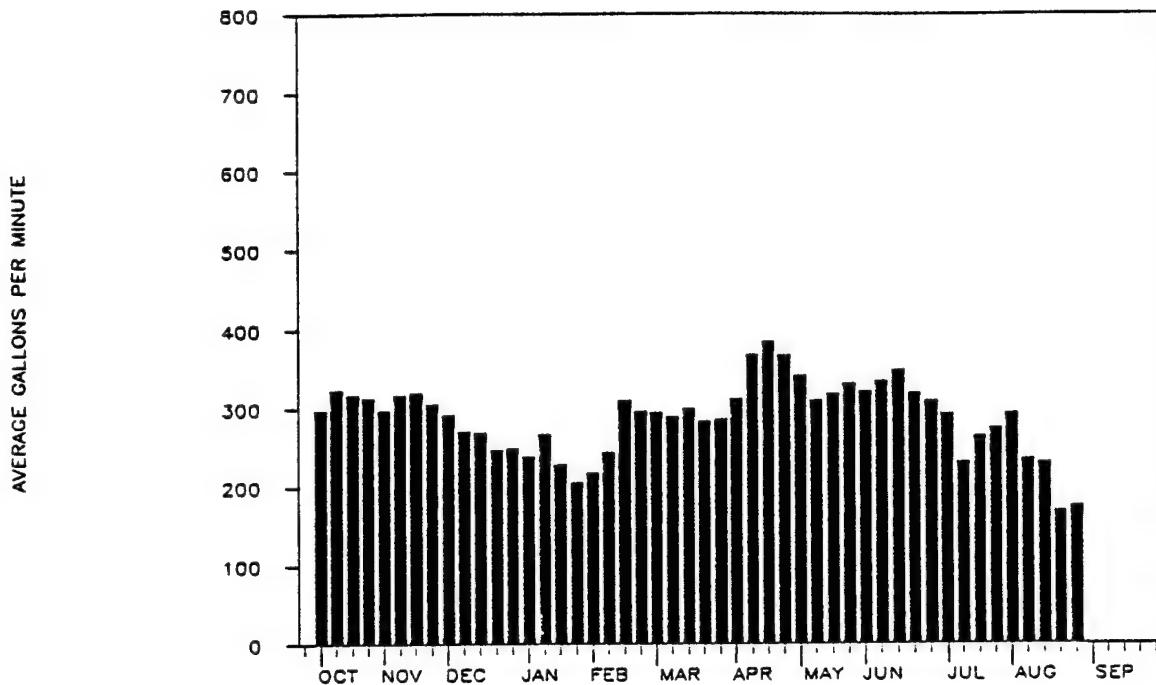


Figure 4. Adsorber 3 flow rate during FY89

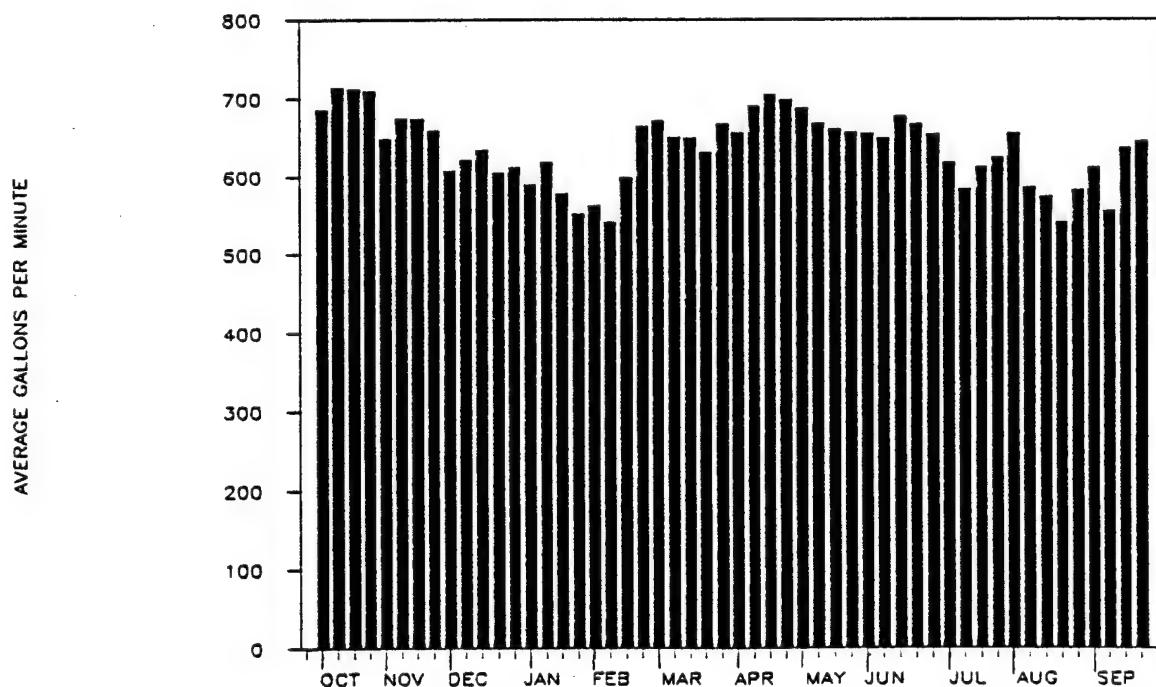


Figure 5. Effluent flow rate during FY89

plant flow data were recorded on a weekly (7 day) basis beginning with the first day of the FY and continuing through the end of the FY.

14. Periods of no flow were experienced by each of the adsorbers during various times of the year (see Figures 2-5). The optimal dewatering/recharge rate can be maintained using two adsorbers in parallel with the third adsorber being maintained in a standby status. During FY89, the total system flow rate (effluent) ranged from a low of 541 gpm to a high of approximately 714 gpm. Average adsorber and total flow rates and total gallons of water treated during FY89 are presented in Table 3. The total volume treated in FY89 was approximately 11.8 million gallons more than that treated in FY88. The average flow rate in FY89 was approximately 24.7 gpm greater than that for FY88. It should be noted that the flow rate through the system was increased at the end of FY88 to improve hydrologic conditions by increasing the volume of recharge along the northwest end of the system (see the FY88 Operational Assessment Report for more details). This increased flow was continued throughout FY89.

Table 3  
FY 89 System Flow Quantities

| <u>Adsorber</u> | <u>Average Flow Rate<br/>(gpm)</u> | <u>Total Volume<br/>Treated<br/>(gal)</u> |
|-----------------|------------------------------------|---|
| 1               | 214.03                             | 112,680,000                               |
| 2               | 156.99                             | 82,727,000                                |
| 3               | 265.51                             | 139,161,000                               |
| Total Effluent  | 636.53                             | 334,568,000                               |

System Influent and Effluent Water Quality

15. The quality of the influent and effluent from the treatment system is monitored periodically by taking grab samples and analyzing them. A single sample was collected from the influent sump to determine the quality of water flowing to the adsorbers. A single sample was collected from the effluent sump after treatment.

16. The influent and effluent samples were analyzed for the contaminants listed in Table 1 of this report. A statistical summary of the chemical

analysis data for the period October 1988 through September 1989 are presented in tabular form in Appendix B of this report. Graphs of the concentrations found for aldrin, chloride, chloroform, DIMP, dieldrin, endrin, fluoride, isodrin, parathion, sulfate, tetrachloroethylene, and trichloroethylene, over the reporting period (FY89) have been constructed and are presented in Figures 6 through 17. No concentrations of the other organic contaminants analyzed for in Table 1 in excess of their respective certified reporting limits were found in the samples collected during FY89. Therefore, no graphs were constructed for these undetected contaminants.

17. A separate graph has been constructed for each contaminant detected in the plant influent and effluent. Each graph presents a plot of the contaminant concentration reported and three lines indicating the certified reporting limit (CRL), the maximum operating limit (MOL) permitted, and the average concentration over the FY where sufficient data above CRL were available to calculate an average. The MOL used in this report is defined as the water quality criterion against which the operating performance of the treatment plant is compared in order to assess treatment effectiveness for the various contaminants of concern. A list of the MOL's used during the FY89 operational assessment is presented in Table 4. An average concentration was only computed for sets of data where 70 percent or more of the readings were above the CRL. When the criterion was met, values falling below the CRL were made equal to the CRL and included in the computations.

#### Aldrin

18. The CRL for aldrin (Figure 6) in FY89 was 0.05 ppb. The MOL for the NWBS treatment plant was 0.2 ppb. Two samples of plant influent out of 52 collected during the year were found to contain aldrin above the CRL with a maximum concentration of approximately 0.1 ppb which is well below the MOL. Three samples of plant effluent were found to contain aldrin in excess of the CRL but all concentrations were below the MOL.

#### Chloride

19. The CRL for chloride (Figure 7) was not reported. No MOL has been established. The concentration of chloride in the plant influent ranged from 200 ppm to 360 ppm with an average for the year of 260 ppm based on 54 samples. The concentrations in the plant effluent ranged from 200 ppm to 350 ppm with an average for the year of 261 ppm. As evidenced by the data, chloride was not removed from the ground water by the activated carbon treatment system.

Table 4  
Maximum Operating Limits for Northwest Boundary System

| <u>Parameter</u>                            | <u>Maximum<br/>Operating<br/>Limit (MOL)</u> | <u>Source*</u>   |
|---|--|--|
| Aldrin                                      | 0.2 $\mu\text{g/l}$                          | Guidance from OTSG (Army) until standards are developed.   |
| Chloride                                    | N.A.   | EPA Secondary Drinking Water Regulation standard is 250 mg/l   |
| Dibromochloropropane<br>(DBCP)              | 0.2 $\mu\text{g/l}$                          | State of Colorado Department of Health limit per letter to Commander, RMA, 26 June 79.   |
| Dicyclopentadiene<br>(DCPD)                 | 24.0 $\mu\text{g/l}$                         | The State of Colorado has requested the Army to meet a limit of 24 $\mu\text{g/l}$ for DCPD based on an odor threshold value.  |
| Diisopropylmethyl-<br>phosphonate<br>(DIMP) | 500 $\mu\text{g/l}^{**}$                     | These criteria are recommended by the US Medical Bioengineering Research and Development Lab (26 Aug 76) and are based on toxicology studies (26 Aug 76) conducted by the Army. The National Academy of Sciences Committee on Military Environmental Research has reviewed the procedures and results of toxicology studies and concurred in the drinking water levels (1 Feb 77). |
| Dieldrin                                    | 0.2 $\mu\text{g/l}$                          | Guidance from OTSG (Army) until standards are developed.   |
| Endrin                                      | 0.2 $\mu\text{g/l}$                          | EPA National Primary Drinking Water Regulation.  |
| Fluoride                                    | N.A.   | EPA final Rule on Fluoride, National Primary and Secondary Drinking Water Standards, 40 CFR Parts 141, 142, and 143, maximum concentration limit is 4.0 mg/l.  |

---

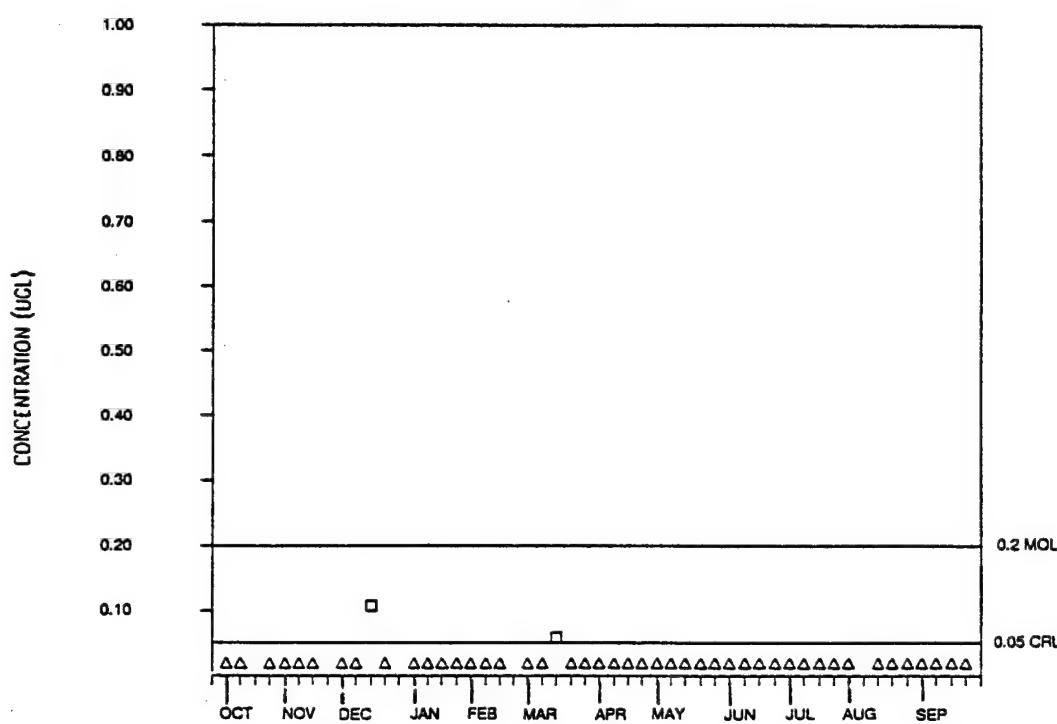
N.A. = Not Applicable

\* Source: After Rocky Mountain Arsenal Contamination Control Program Management Team (1983)

\*\* The Environmental Protection Agency's Office of Drinking Water Washington, D.C. issued a health advisory in December 1988 for DIMP not to exceed 600  $\mu\text{g/l}$ .

PLANT INFLUENT - ALDRN

FY 89



PLANT EFFLUENT - ALDRN

FY 89

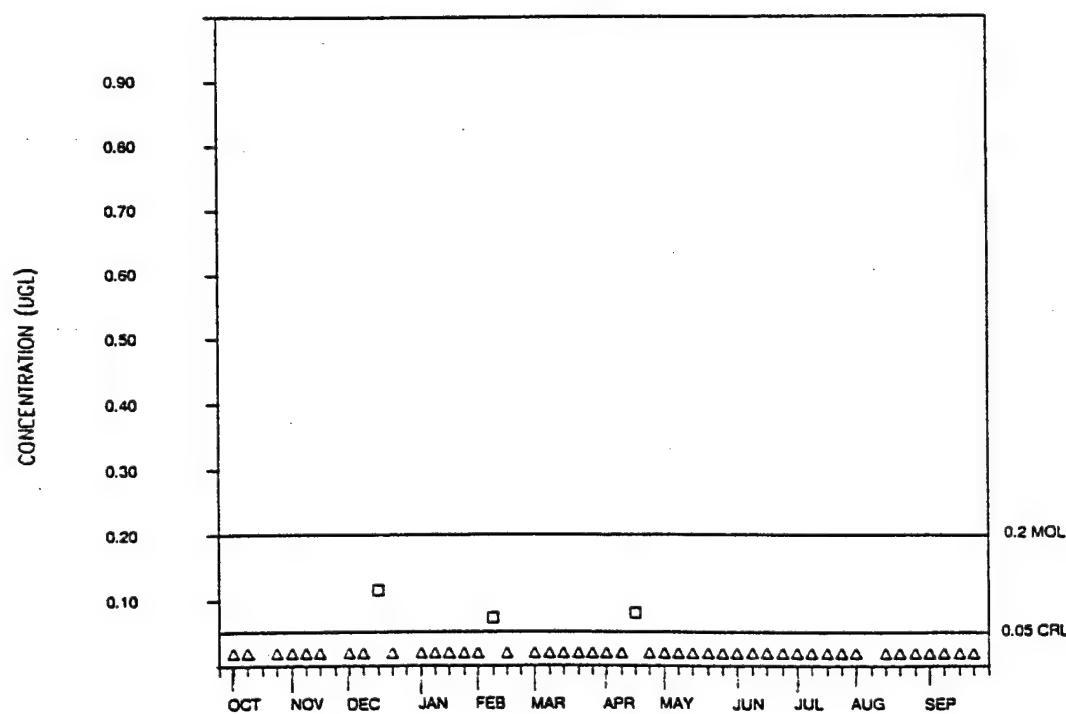
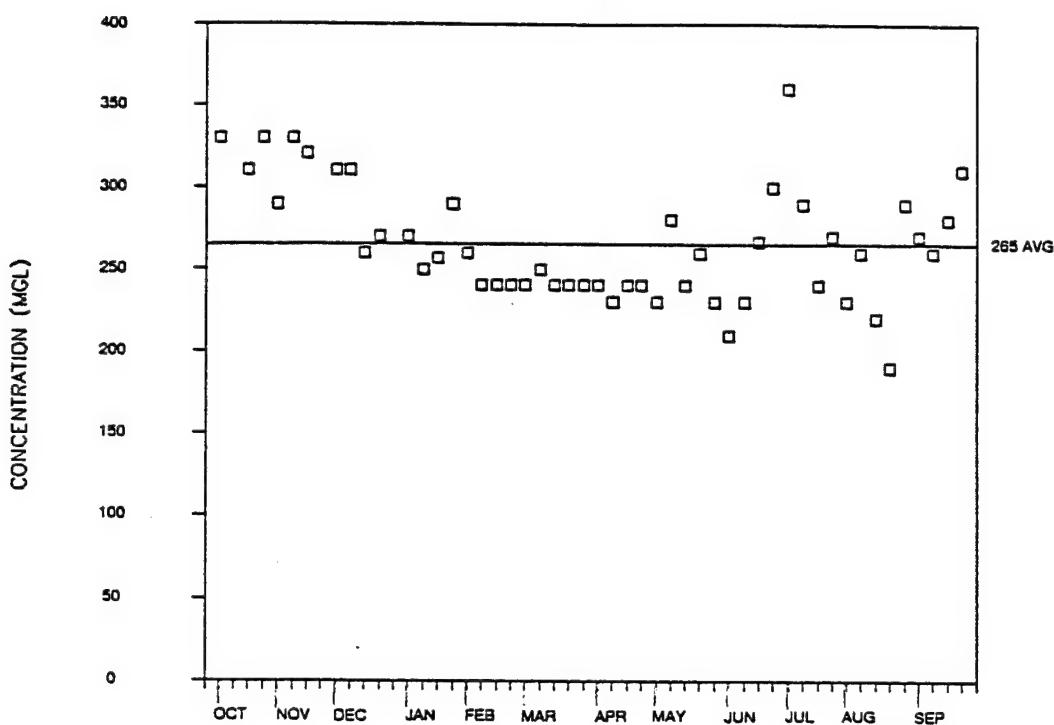


Figure 6. FY89 Aldrin concentrations

PLANT INFLUENT - CHLORIDE  
FY 89



PLANT EFFLUENT - CHLORIDE  
FY 89

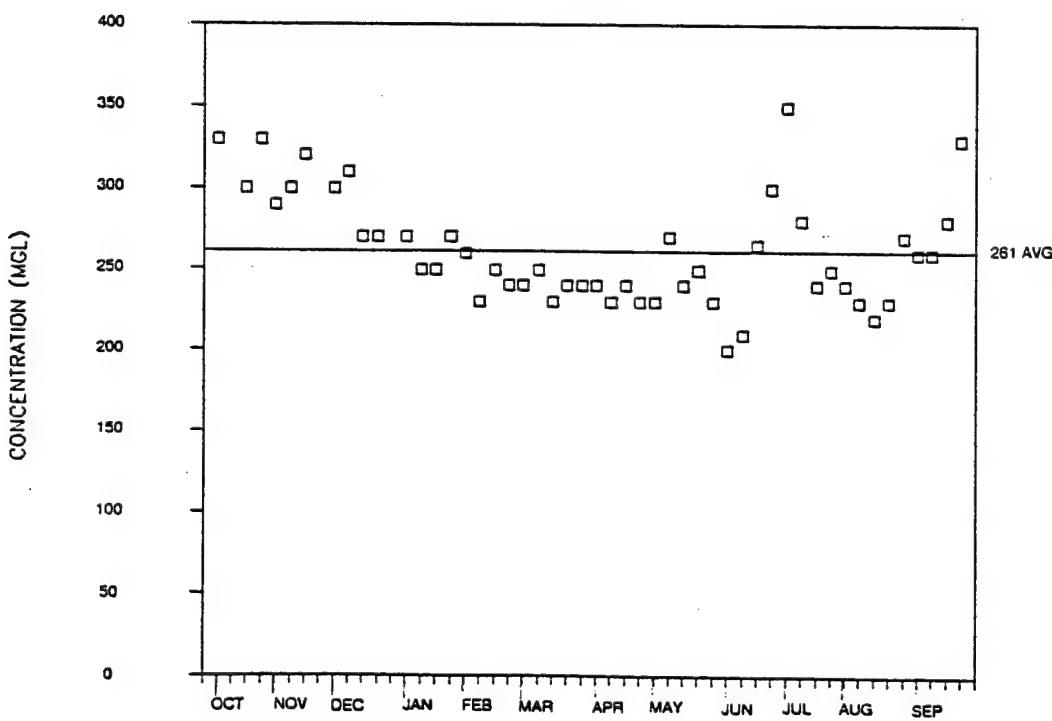


Figure 7. FY89 Chloride concentrations

Chloroform

20. The CRL for chloroform (Figure 8) is FY89 was 0.5 ppb. No MOL has been established. Only two samples each were collected from the plant influent and effluent streams. The maximum concentration in the influent was approximately 49 ppb with an average for the two samples of 34.7 ppb. The highest concentration in the effluent was approximately 23 ppb with an average for the two samples of 21.6 ppb. Chloroform is not as effectively adsorbed by activated carbon as are other organic contaminants found at RMA.

DIMP

21. The CRL for DIMP (Figure 9) in FY89 was 0.65 ppb. The MOL for the NWBS treatment plant was 500 ppb. All of the influent and effluent samples collected during the year, 51 and 49 samples, respectively, had DIMP concentrations in excess of the CRL. The concentrations generally ranged from 2 to 6 ppb with the exception of a sample collected in July, 1989. The influent sample on that date was reported as containing 860 ppb DIMP while the effluent sample was reported as containing 830 ppb. These values are probably anomalous since they are so much higher than any other values reported during the year. As a result, these values were not plotted and were not included in the calculation of the averages. The average DIMP concentrations in the influent and effluent were 3.32 ppb and 4.17 ppb, respectively.

Dieldrin

22. The CRL for dieldrin (Figure 10) in FY89 was 0.05 ppb. The MOL for the NWBS treatment plant was 0.2 ppb. Most of the 53 influent samples collected during the year had dieldrin concentrations in excess of the CRL. The maximum concentration reported was approximately 0.65 ppb. The average concentration in the influent over the year was 0.4 ppb. Only four samples of plant effluent were found to contain dieldrin in excess of the CRL with a maximum concentration of approximately 0.19 ppb. Thus, effluent concentrations did not exceed the MOL during FY89.

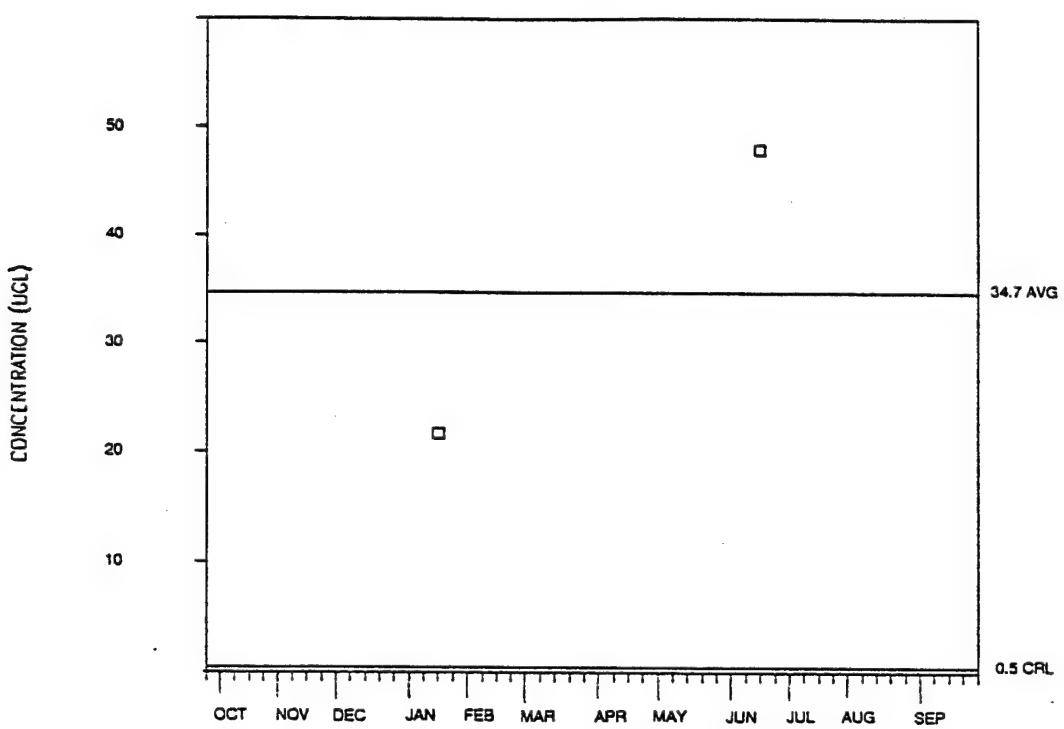
Endrin

23. The CRL for endrin (Figure 11) in FY89 was 0.05 ppb. The MOL for the NWBS treatment plant was 0.2 ppb. Only one sample of plant influent out of the 53 collected had an endrin concentration slightly in excess of the CRL. No concentrations of endrin above the CRL were found in the plant effluent.

Fluoride

24. The CRL for fluoride (Figure 12) was not reported. No MOL has been established. Concentrations of fluoride in the plant influent ranged from

**PLANT INFLUENT - CHCL3**  
FY 89



**PLANT EFFLUENT - CHCL3**  
FY 89

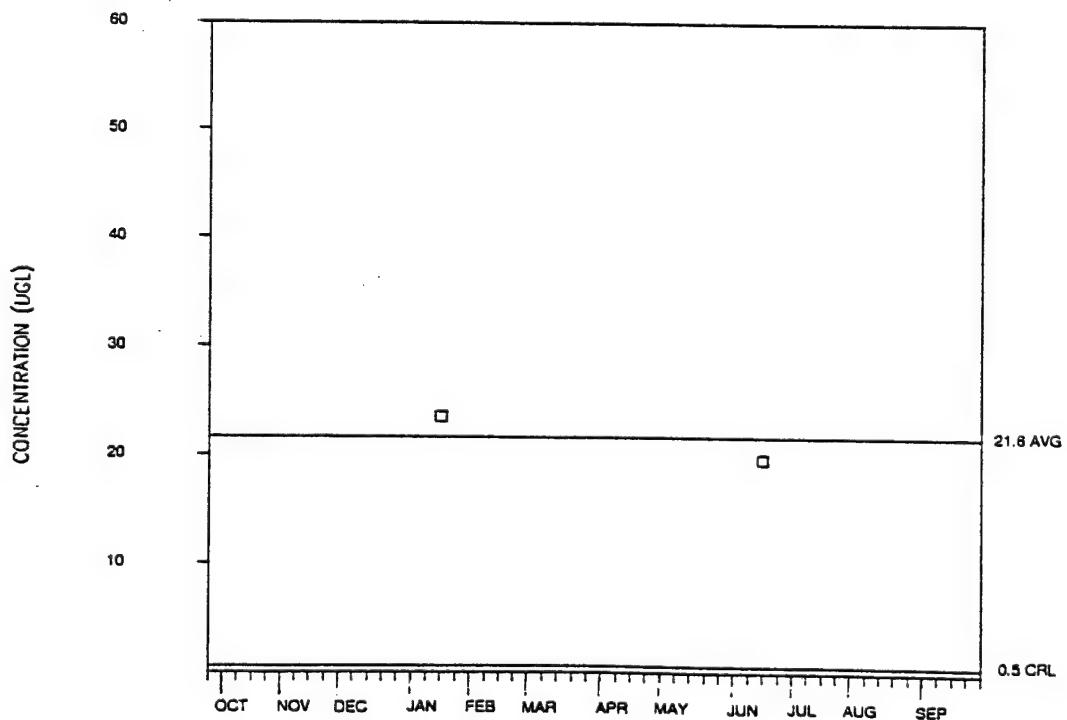
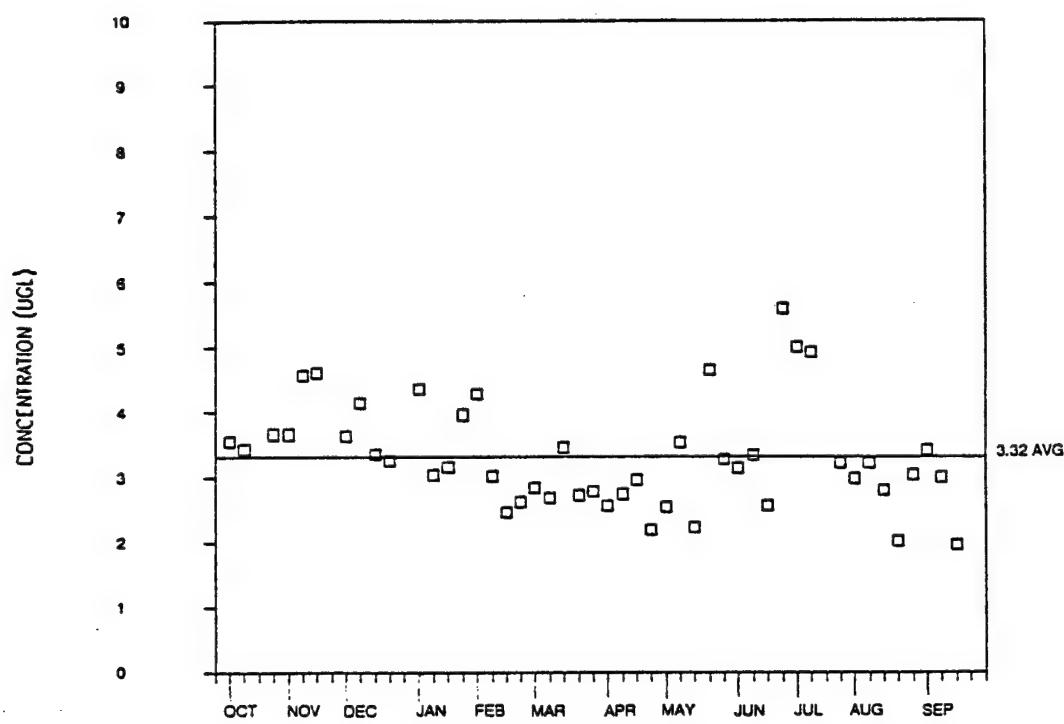


Figure 8. FY89 Chloroform (CHCL3) concentrations

PLANT INFLUENT - DIMP

FY 89



MOL = 500  
PLANT EFFLUENT - DIMP

FY 89

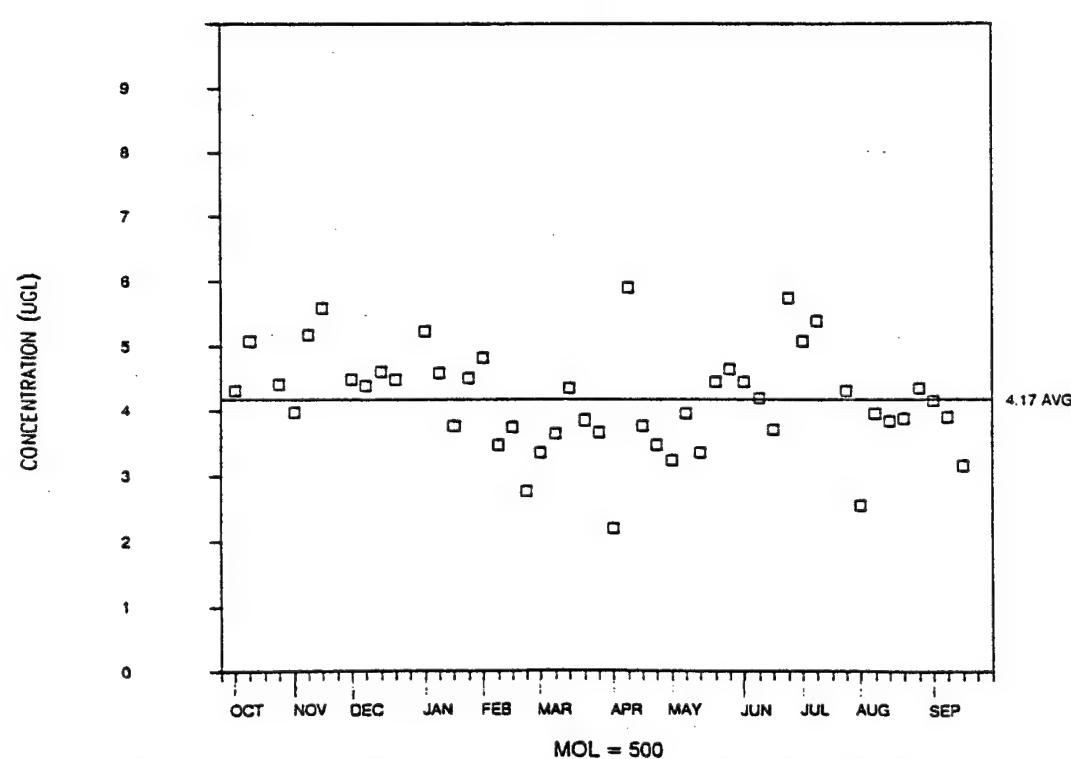
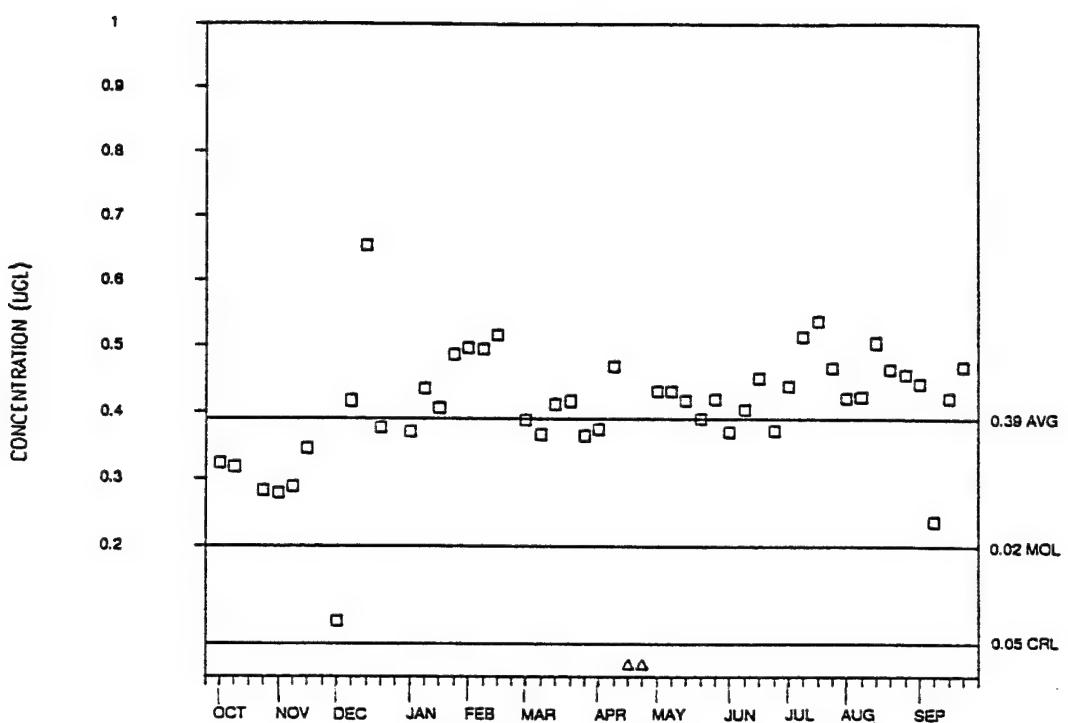


Figure 9. FY89 Diisopropylmethylphosphonate (DIMP) concentrations

PLANT INFLUENT - DLDRN  
FY 89



PLANT EFFLUENT - DLDRN  
FY 89

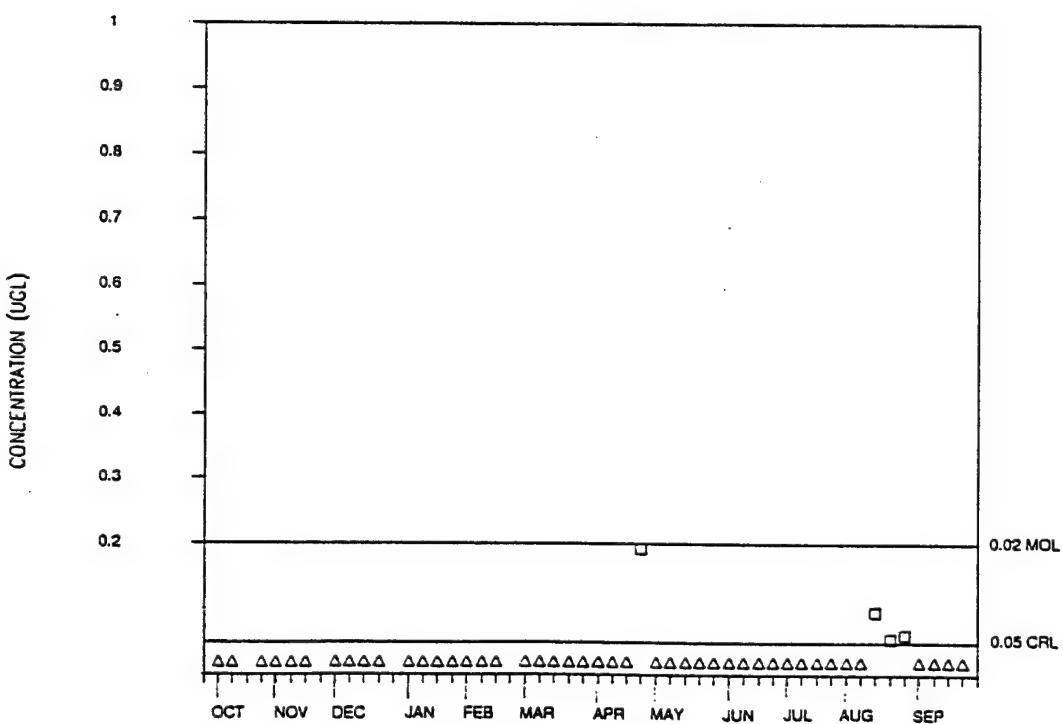
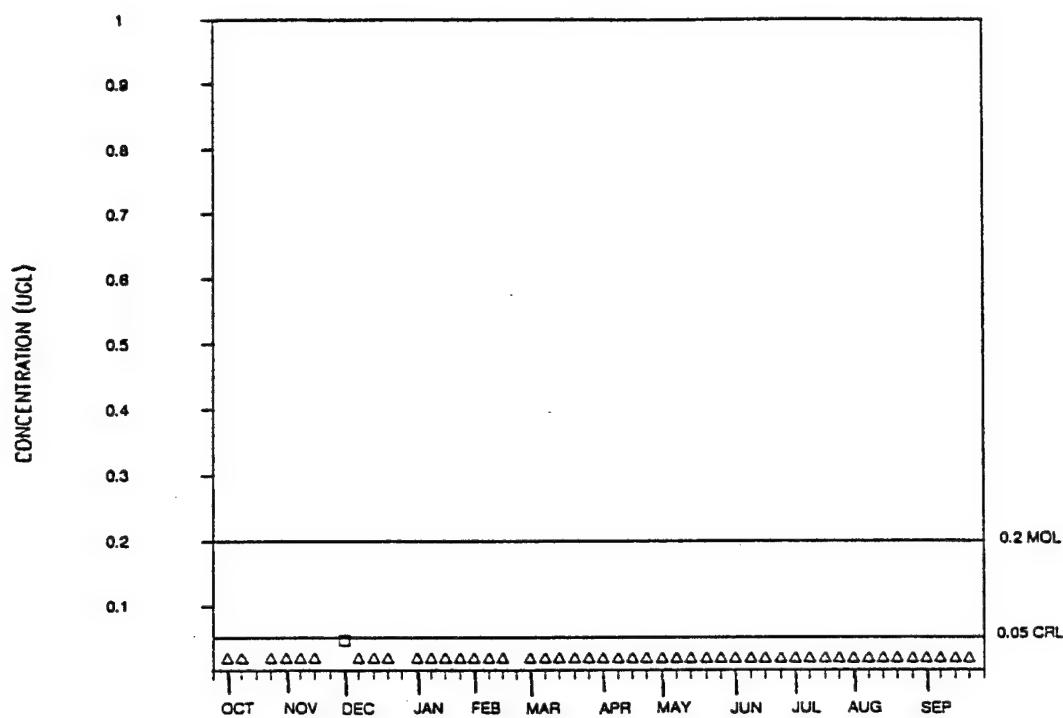


Figure 10. FY89 Dieldrin concentrations

PLANT INFLUENT - ENDRN  
FY 89



PLANT EFFLUENT - ENDRN  
FY 89

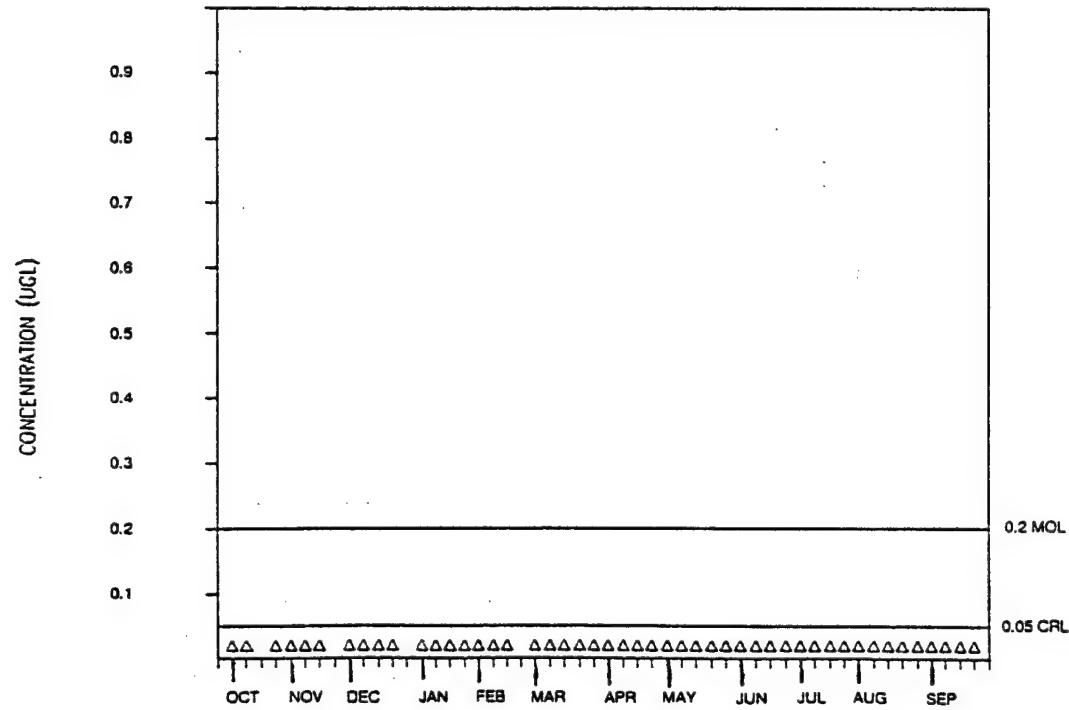


Figure 11. FY89 Endrin concentrations

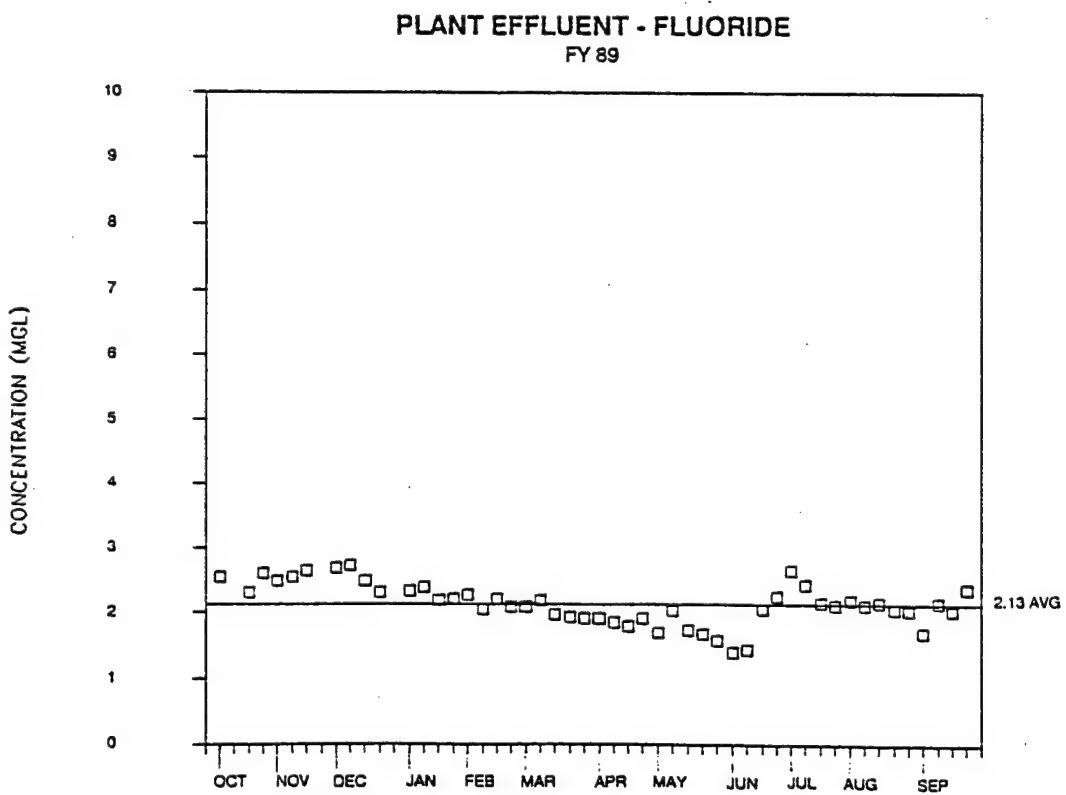
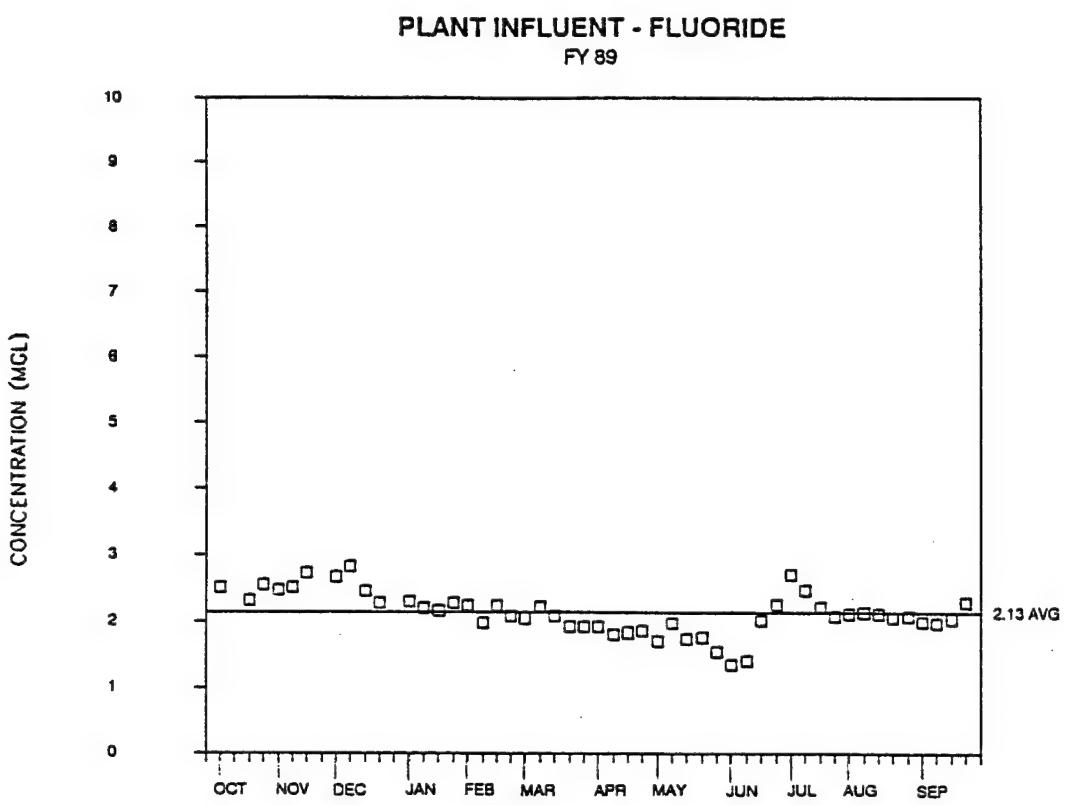


Figure 12. FY89 Fluoride concentrations

1.4 ppm to 2.8 ppm with an average for the year of 2.1 ppm. The concentrations in the plant effluent ranged from 1.4 ppm to 2.7 ppm with an average of 2.1 ppm. As the data indicate, fluoride was not removed from the ground water by the activated carbon treatment system.

Isodrin

25. The CRL for isodrin (Figure 13) was 0.051 ppb in FY89. No MOL has been established. Five influent samples out of the 53 collected during the year had isodrin concentrations above the CRL with a maximum reported concentration of 0.09 ppb. No concentrations of isodrin above the CRL were found in the plant effluent.

Parathion

26. The CRL for parathion (Figure 14) in FY89 was 0.647 ppb. No MOL has been established. Only two samples each were collected from the plant influent and effluent streams during the year. One of the samples of influent had a concentration of 1.8 ppb parathion while the other was below the CRL. One of the samples of effluent had a concentration of 1.7 ppb parathion while the other sample was reported to be less than the CRL.

Sulfate

27. The CRL for sulfate (Figure 15) was not reported. No MOL has been established. Only two samples each were collected from the plant influent and effluent streams during the year. The average concentrations for both the influent and effluent were 135 ppm. As the data indicate, sulfate was not removed from the ground water by the activated carbon treatment system.

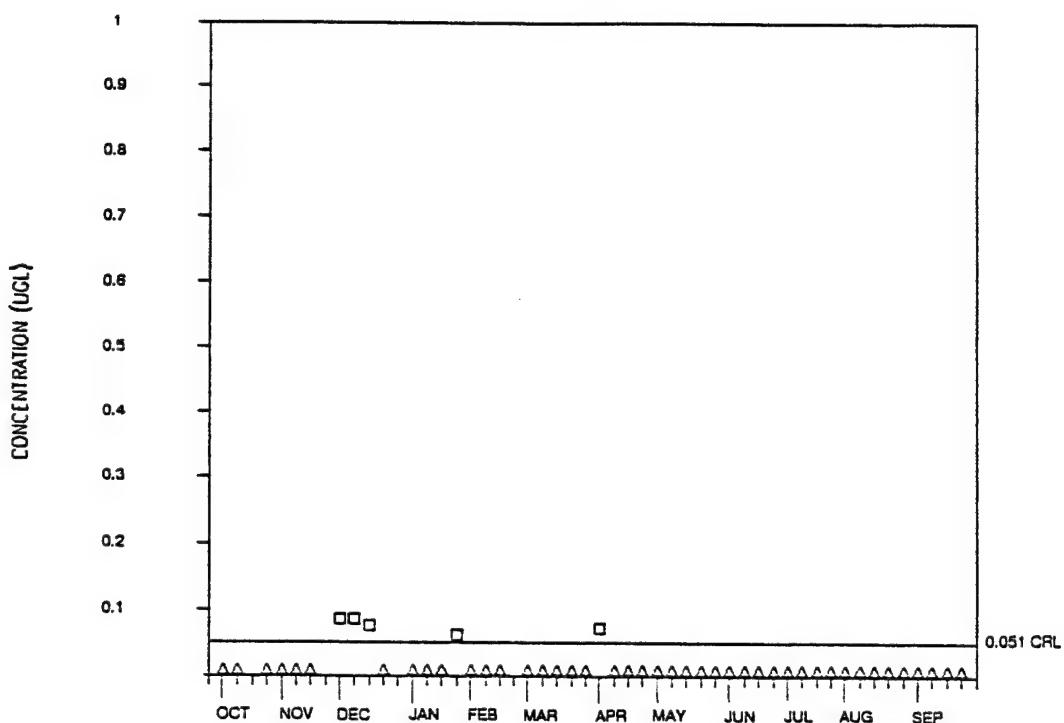
Tetrachloroethylene

28. The CRL for tetrachloroethylene (Figure 16) was 0.75 ppb in FY89. No MOL has been established. Only one sample was collected from each of the plant influent and effluent streams during the year. The tetrachloroethylene concentration in the influent sample was below the CRL while the concentration in the effluent sample was approximately 2 ppb.

Trichloroethylene

29. The CRL for trichloroethylene (Figure 17) was 0.56 ppb in FY89. No MOL has been established. Only one influent sample out of the 54 collected had a trichloroethylene concentration in excess of the CRL at approximately 0.9 ppb. No concentrations of trichloroethylene above the CRL were found in the plant effluent.

**PLANT INFLUENT - ISODR**  
FY 89



**PLANT EFFLUENT - ISODR**  
FY 89

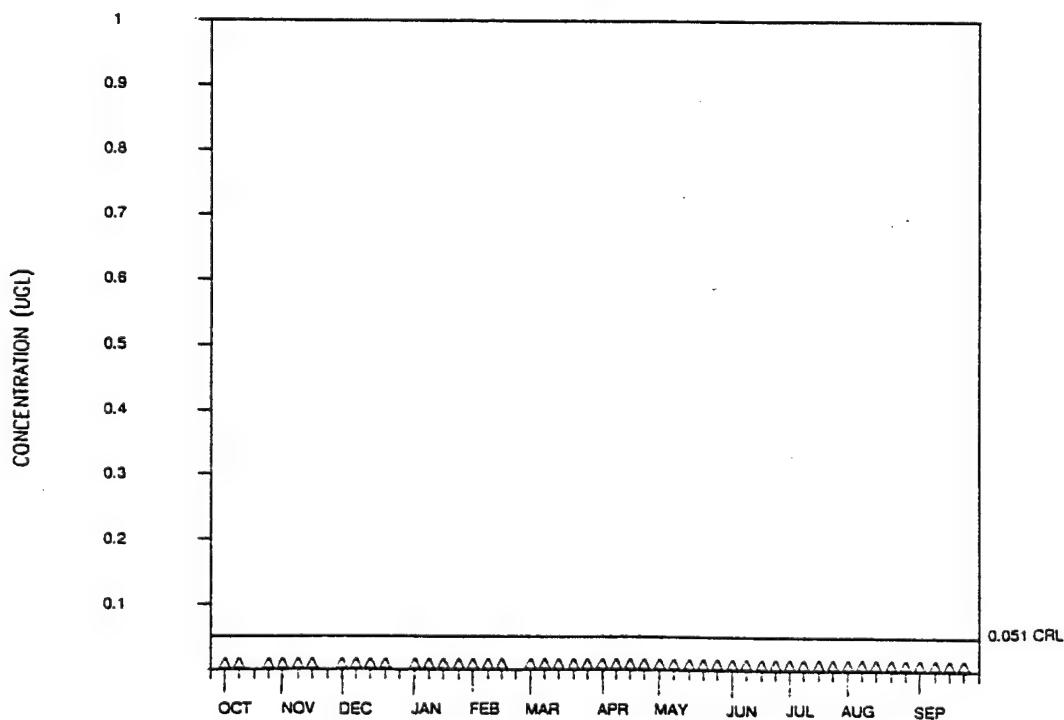
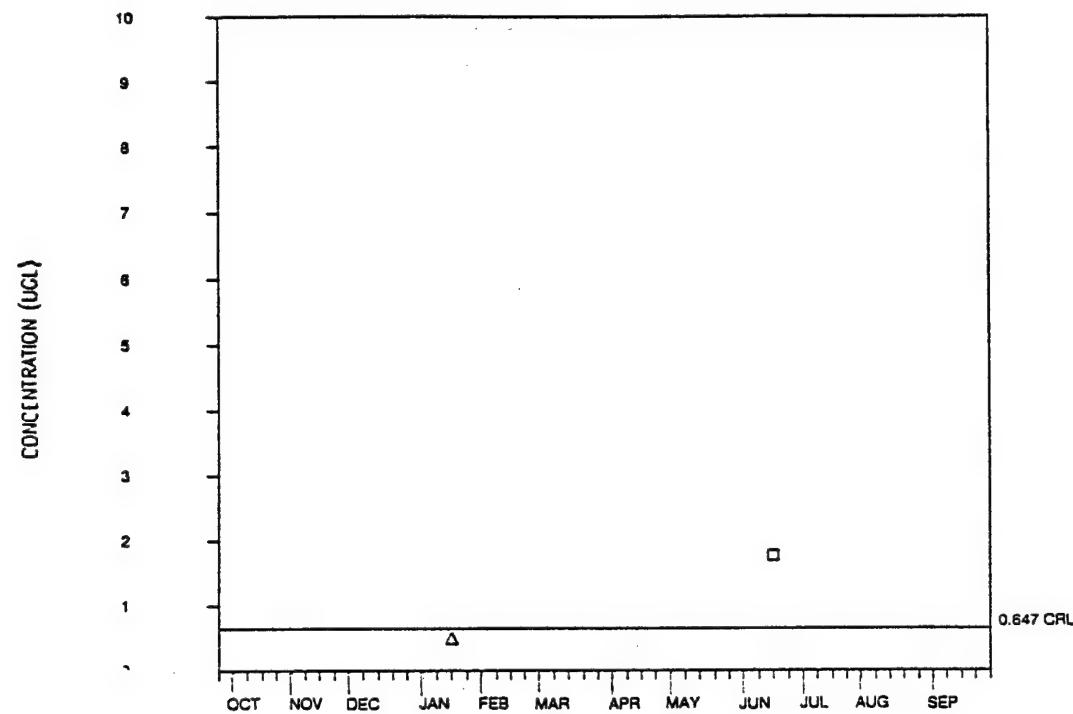


Figure 13. FY89 Isodrin concentrations

**PLANT INFLUENT - PRTHN**  
FY 89



**PLANT EFFLUENT - PRTHN**  
FY 89

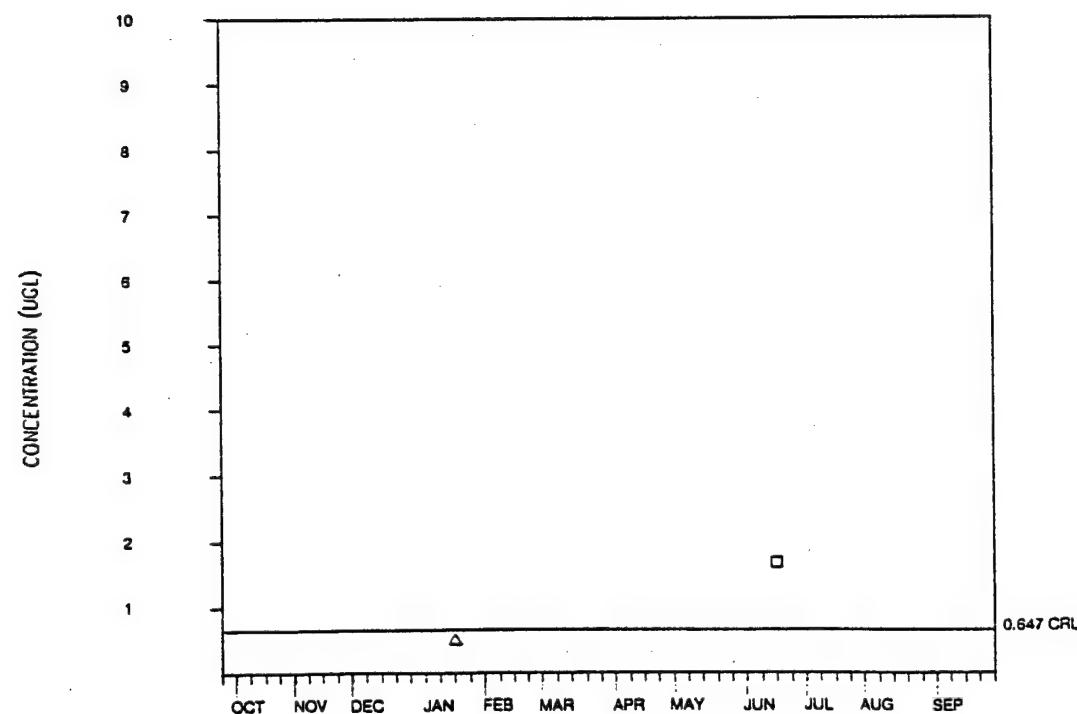
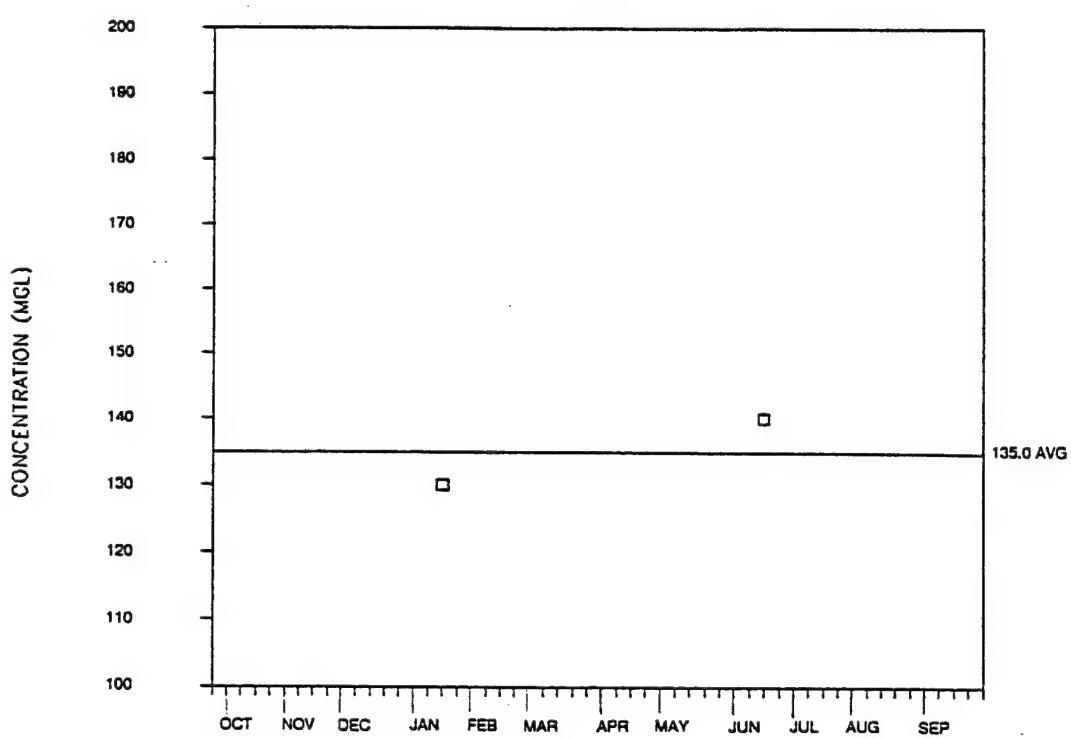


Figure 14. FY89 Parathion concentrations

**PLANT INFLUENT - SO<sub>4</sub>**

FY 89



**PLANT EFFLUENT - SO<sub>4</sub>**

FY 89

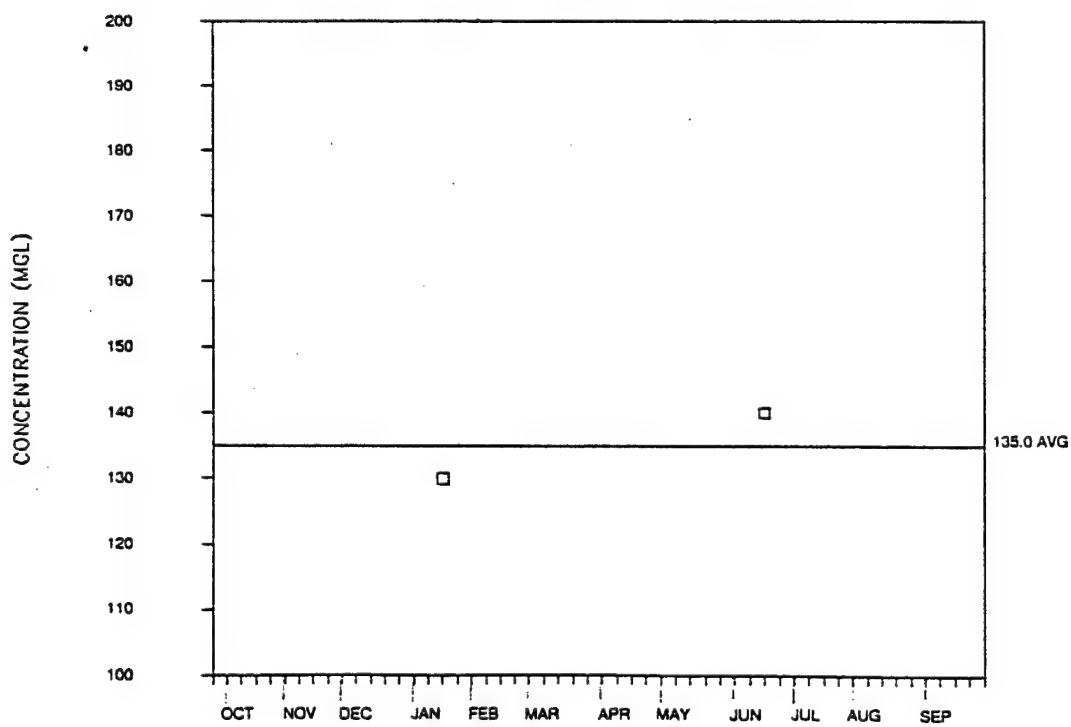
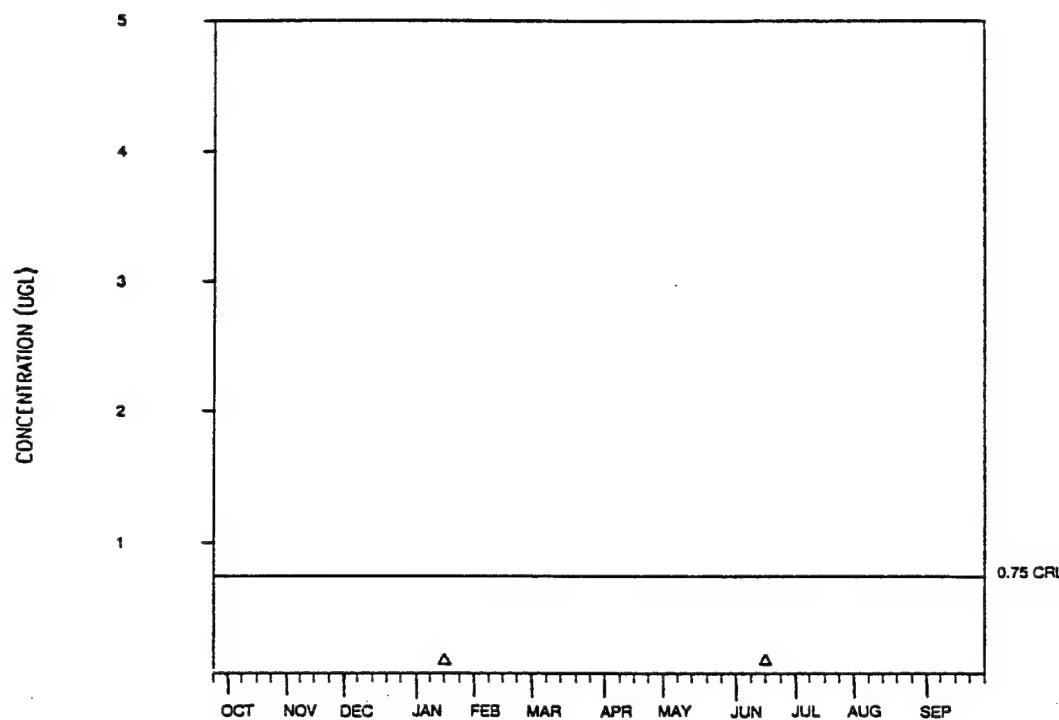


Figure 15. FY89 Sulfate (SO<sub>4</sub>) concentrations

**PLANT INFLUENT - TCLEE**  
FY 89



**PLANT EFFLUENT - TCLEE**  
FY 89

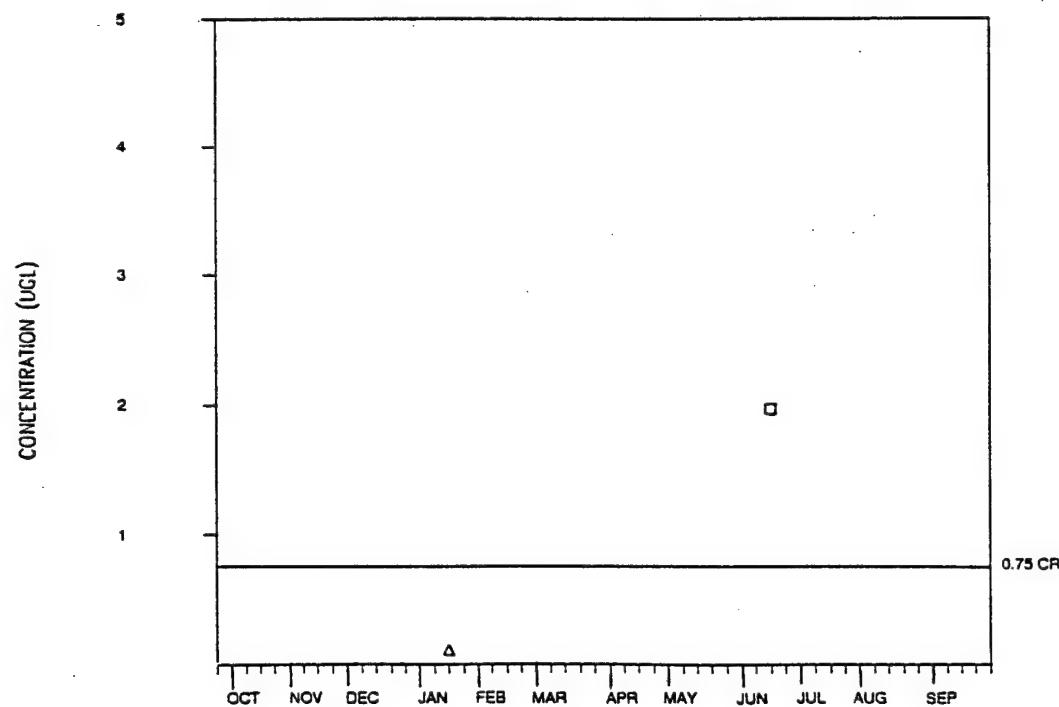
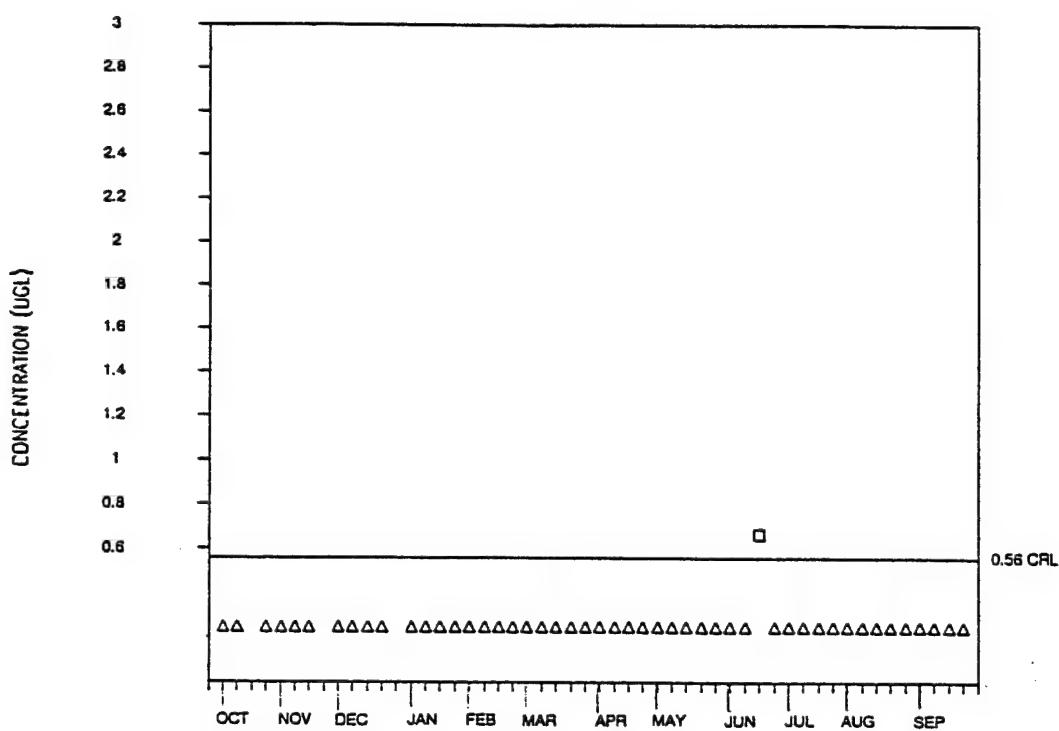


Figure 16. FY89 Tetrachloroethylene (TCLEE) concentrations

PLANT INFLUENT - TRCLE  
FY 89



PLANT EFFLUENT - TRCLE  
FY 89

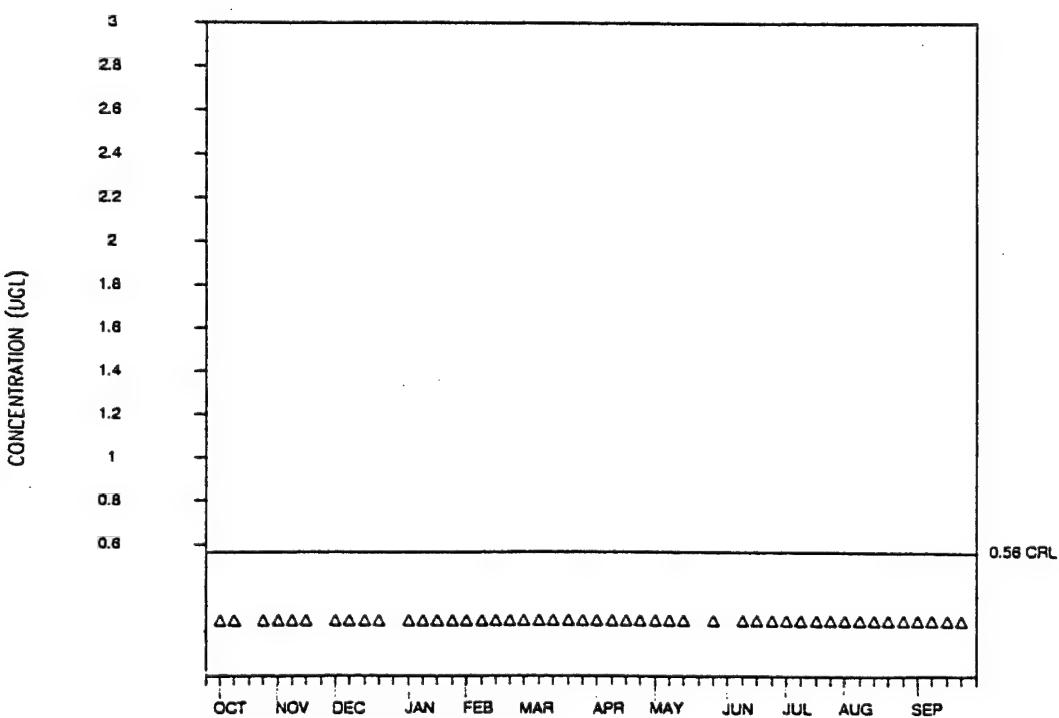


Figure 17. FY89 Trichloroethylene (TRCLE) concentrations

#### GS/MS Analysis

30. GC/MS analyses were conducted on influent and effluent samples collected in June, 1989. The results of the analysis are presented in Appendix B. No concentrations of contaminants above their respective detection levels were reported in either the influent or effluent sample.

#### Summary of System Water Quality Data

31. The NWBS treatment plant was generally successful in removing organic contaminants from the ground water treated during FY89. Of the organics analyzed for on a weekly basis, only DIMP was routinely found in the plant effluent at concentrations above the CRL. The DIMP concentrations were two orders of magnitude below the MOL with the exception of one sample collected in July 1989. The result reported for that date is considered anomalous. Several effluent samples collected during the year were found to contain aldrin and dieldrin concentrations in excess of their respective CRL's, however all the concentrations were below their respective MOL's.

32. Of the organics analyzed for only once or twice a year, chloroform, parathion, and tetrachloroethylene were found in effluent samples above their respective CRL's. Due to the limited number of samples collected, it is difficult to determine whether the CRL's are exceeded routinely or only occasionally. Analysis of more samples for these contaminants are needed over the year in order to determine realistic average effluent concentrations.

#### Contaminant Mass Removal

33. A calculation of the total mass of contaminants removed by the NWBS treatment system during FY87, FY 88, and FY89 was conducted by the Technical Operations Division as part of a multi-year study on all the water treatment systems in operation at RMA. A summary of the results from this study for the NWBS is present in Table 5. The amount of contaminants removed is given in pounds with a total for FY87, FY88, and FY89 of approximately 16, 18, and 3 pounds respectively. The contaminants with the largest amounts removed include chloroform, dicyclopentadiene, and dieldrin. The calculations were conducted using a simple mass balance. Average annual effluent concentrations were subtracted from average influent concentrations. Values less than the detection limits on CRL were treated as zero. The calculated values vary between years depending primarily on the average influent concentrations of the contaminants.

Table 5  
Northwest Boundary System Contaminant Removal, FY87-FY89

| <u>Contaminant</u>     | <u>Abbreviation</u> | <u>Pounds Removed</u> |             |             |
|------------------------|---------------------|-----------------------|-------------|-------------|
|                        |                     | <u>FY87</u>           | <u>FY88</u> | <u>FY89</u> |
| Choloroform            | CHCL3               | 9.95                  | 14.04       | 1.78        |
| Combined Organo-Sulfur | CPMSOX              | 0.00                  | 1.15        | 0.00        |
| Dibromochloropropane   | DBCP                | 0.01                  | 0.00        | 0.00        |
| Dicyclopentadiene      | DCPD                | 2.88                  | 1.56        | 0.00        |
| Dieldrin               | DLDRN               | 0.68                  | 0.79        | 1.47        |
| Tetrachloroethylene    | TCLEE               | 1.21                  | 0.00        | 0.00        |
| Trichloroethylene      | TRCLE               | 1.06                  | 0.00        | 0.05        |
| Other Organics         |                     | <u>0.15</u>           | <u>0.06</u> | <u>0.12</u> |
|                        | TOTALS              | 15.93                 | 17.60       | 3.42        |

#### Carbon Usage

34. Carbon usage in the NWBS treatment plant is very low compared to the North Boundary System treatment plant, due to the lower total mass of contamination being removed. No carbon was added to any of the adsorbers during FY89.

#### Contaminant Concentrations in Dewatering Wells

35. In order to provide a picture of the distribution of contaminants in the ground water near the NWBS, contaminant concentrations found associated with each alluvial dewatering well were plotted with respect to the well number along the dewatering well line. Thus, each graph provides a visual representation of a particular contaminants distribution along the length of the system. Based on the availability of data, graphs were developed only for aldrin, chloride, DCPD, DIMP, dieldrin, endrin, fluoride, isodrin, and trichloroethylene for FY89. These graphs are presented in Figures 18 through 26. Each graph presents the data collected for each well during the year. The vertical lines associated with each well number represent the range of concentrations found (maximum and minimum) with the mean value for each well connected by a dotted line. A mean value was only computed for sets of

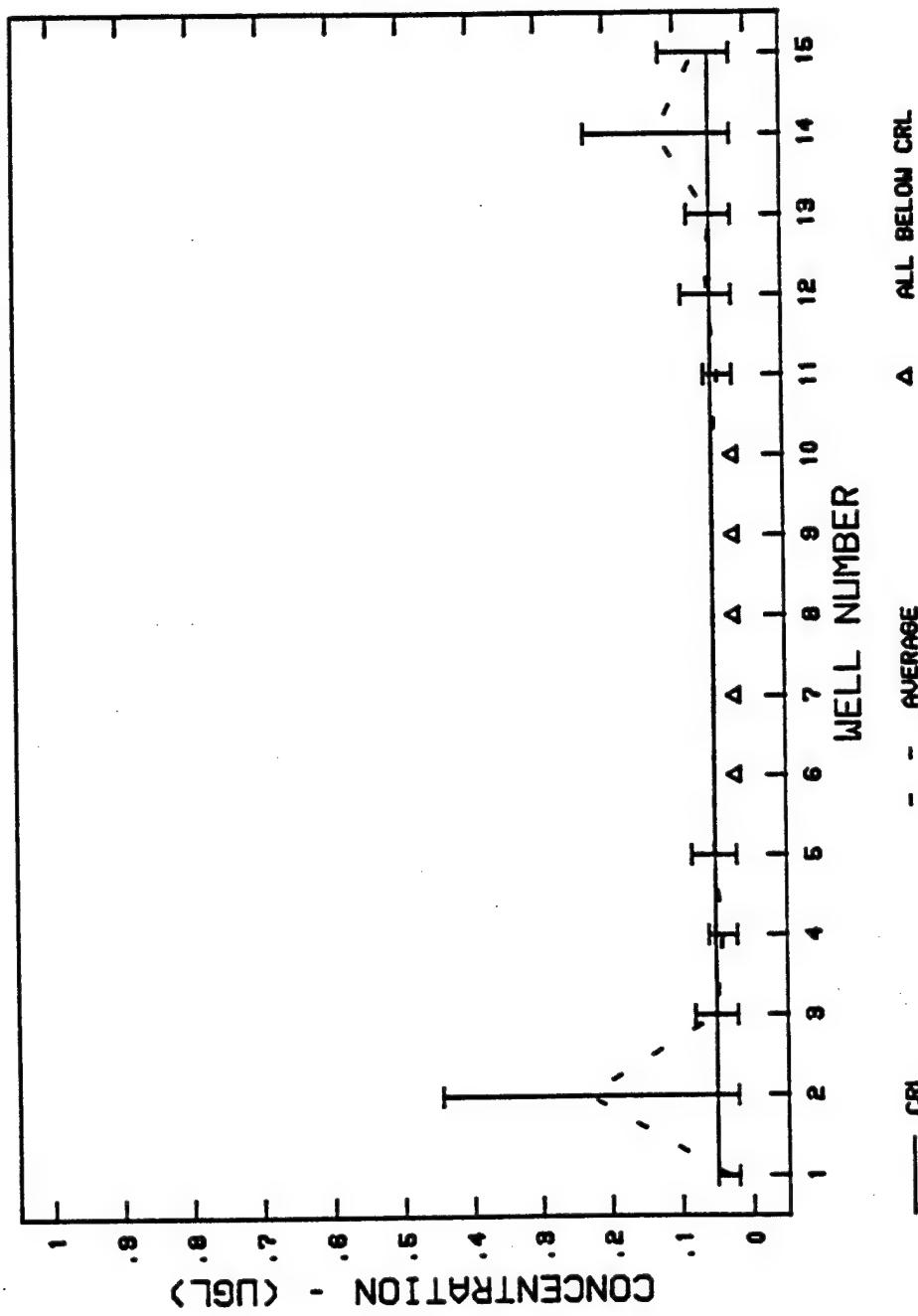


Figure 18. FY89 Aldrin concentration in NWBS dewatering wells

data where 70 percent or more of the readings were above the CRL. When this criterion was met, values falling below the detection limit were made equal to the detection limit or CRL and included in the computations. A single triangle indicates that all values were below the detection limit or CRL. A statistical summary of all the data used to develop the graphs is presented in Appendix C. It should be noted that the maximum number of samples collected from each well was five with only two samples collected in some cases.

Aldrin

36. During FY89, concentration of aldrin (Figure 18) above the CRL were found in samples collected from dewatering wells on the northeast and southwest ends of the control system. The maximum concentration found on the southwest end was approximately 0.45 ppb in well No. 2. The maximum concentration found on the northeast end was approximately 0.22 ppb in well No. 14. No concentrations above the CRL were found associated with well No.'s 6 through 10. The distribution of aldrin along the dewatering well line in FY89 was somewhat similar to that found in FY88, however concentrations above the CRL were found associated with more wells on each end of the system. The concentrations of aldrin found in FY89 were somewhat higher than those reported in FY88.

Chloride

37. The highest concentrations of chloride (Figure 19) during FY89 were found along the northeast end of the control system with a maximum concentration of approximately 800 ppm found associated with well No. 14. The maximum mean concentration on the northeast end of the system was approximately 600 ppm. The chloride concentrations decreased from northeast to southwest along the system with concentrations in the 150 to 200 ppm range found in samples from the southwest end. The distribution of chloride along the dewatering well line in FY89 was very similar to that found in FY88. However, concentrations found in FY89 were somewhat lower than those reported in FY88.

DCPD

38. During FY89, concentrations of DCPD (Figure 20) above the CRL were found associated with well No.'s 2 and 3 with a maximum concentration of approximately 15 ppb reported for well No. 3. None of the other dewatering wells produced samples with DCPD concentrations above the CRL. No DCPD concentrations above the CRL were reported for the dewatering wells in FY88.

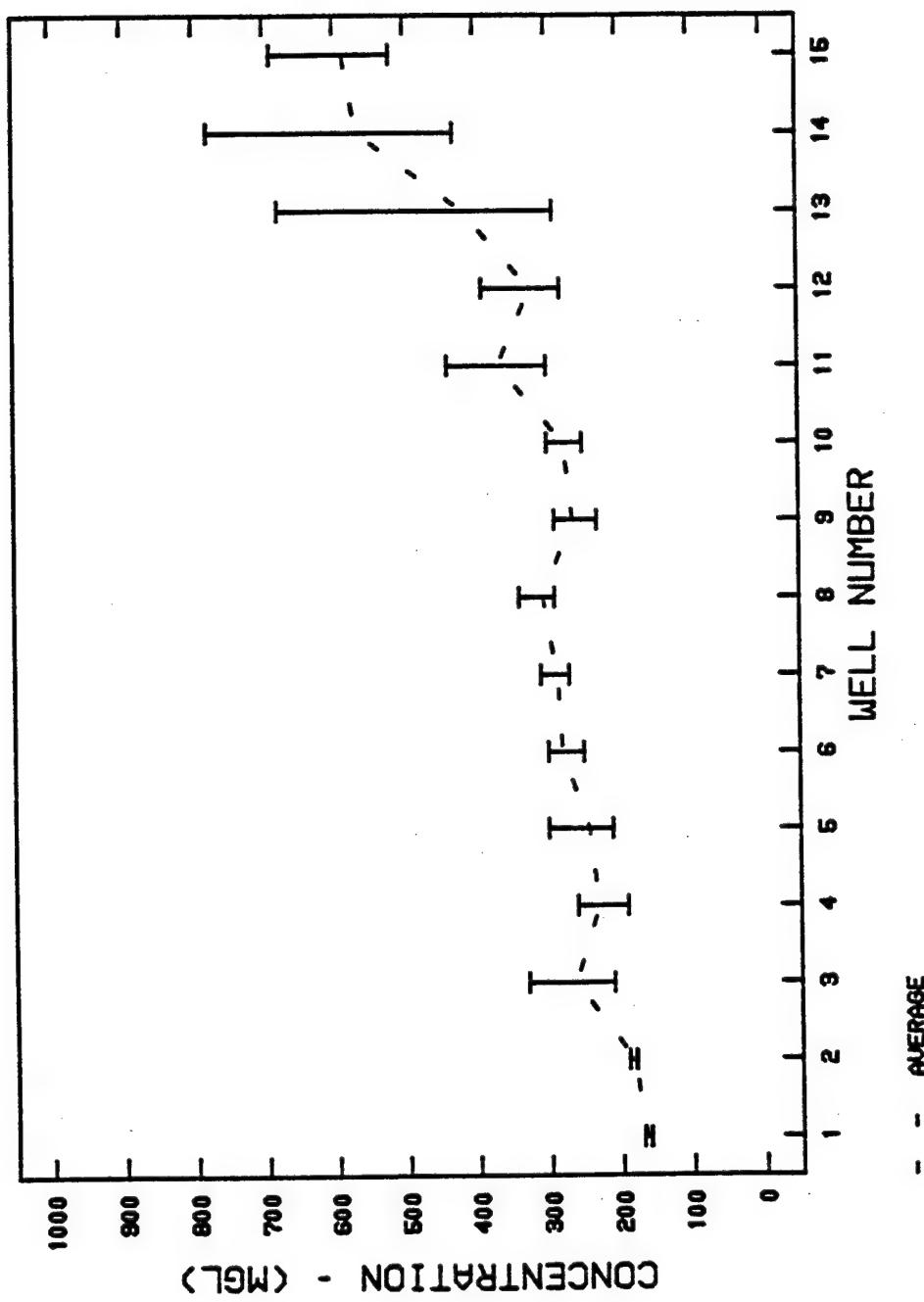


Figure 19. FY89 Chloride concentration in NWBS dewatering wells

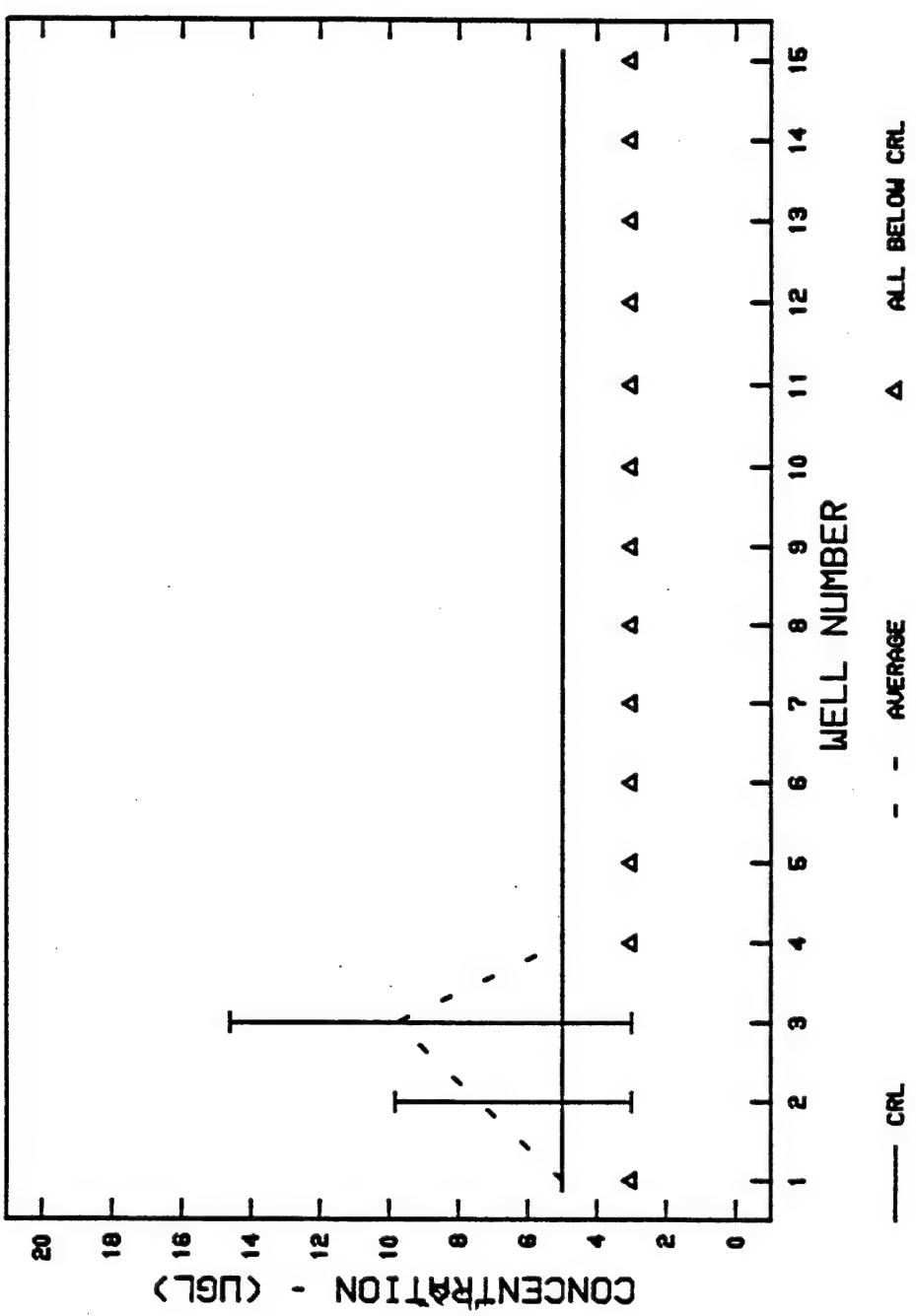


Figure 20. FY89 Dicyclopentadiene (DCPD) concentrations in NWBS dewatering wells

DIMP

39. During FY89, concentrations of DIMP (Figure 21) above the CRL were found in samples from all the dewatering wells except No.'s 1 and 2. The concentrations generally increased from southwest to northeast along the system with the highest concentrations reported for well No.'s 13 through 15. The mean concentration values along the line were generally less than 10 ppb. The distribution of DIMP along the dewatering well line in FY89 was somewhat similar to that found in FY88. The concentrations of DIMP reported in FY89 were lower along the northeast end of the system than those reported in FY88.

Dieldrin

40. During FY89, concentrations of dieldrin (Figure 22) above the CRL were found in samples from all the dewatering wells except No. 9. The concentrations were generally below 1 ppb with the exception of the northeast end of the dewatering well line where a maximum concentration of approximately 7 ppb was reported for well No. 13. The distribution of dieldrin along the system was very similar to that reported in FY88. The concentrations of dieldrin reported in FY89 were generally higher than those reported in FY88, particularly along the northeast end of the system.

Endrin

41. During FY89, concentrations of endrin (Figure 23) above the CRL were found in samples collected from dewatering wells on the northeast and southwest ends of the control system. The maximum concentration found on the southwest end was approximately 0.5 ppb in well No. 2. The maximum concentration found on the northeast end was approximately 0.2 ppb in well No. 14. No concentrations above the CRL were found associated with well No.'s 3 through 12 or with well No. 1. Only one endrin concentration above the CRL (in well No. 6) was reported for the dewatering wells in FY88.

Fluoride

42. In FY89, a general increasing trend in fluoride concentration was found from the southwest to the northeast end of the system (Figure 24). A maximum concentration of fluoride of approximately 5 ppm was reported for well No.'s 8, 13 and 15. The average concentrations found associated with the wells generally ranged from 1.5 to 4 ppm. The distribution and concentrations of fluoride found in FY89 did not vary significantly from those found in FY88.

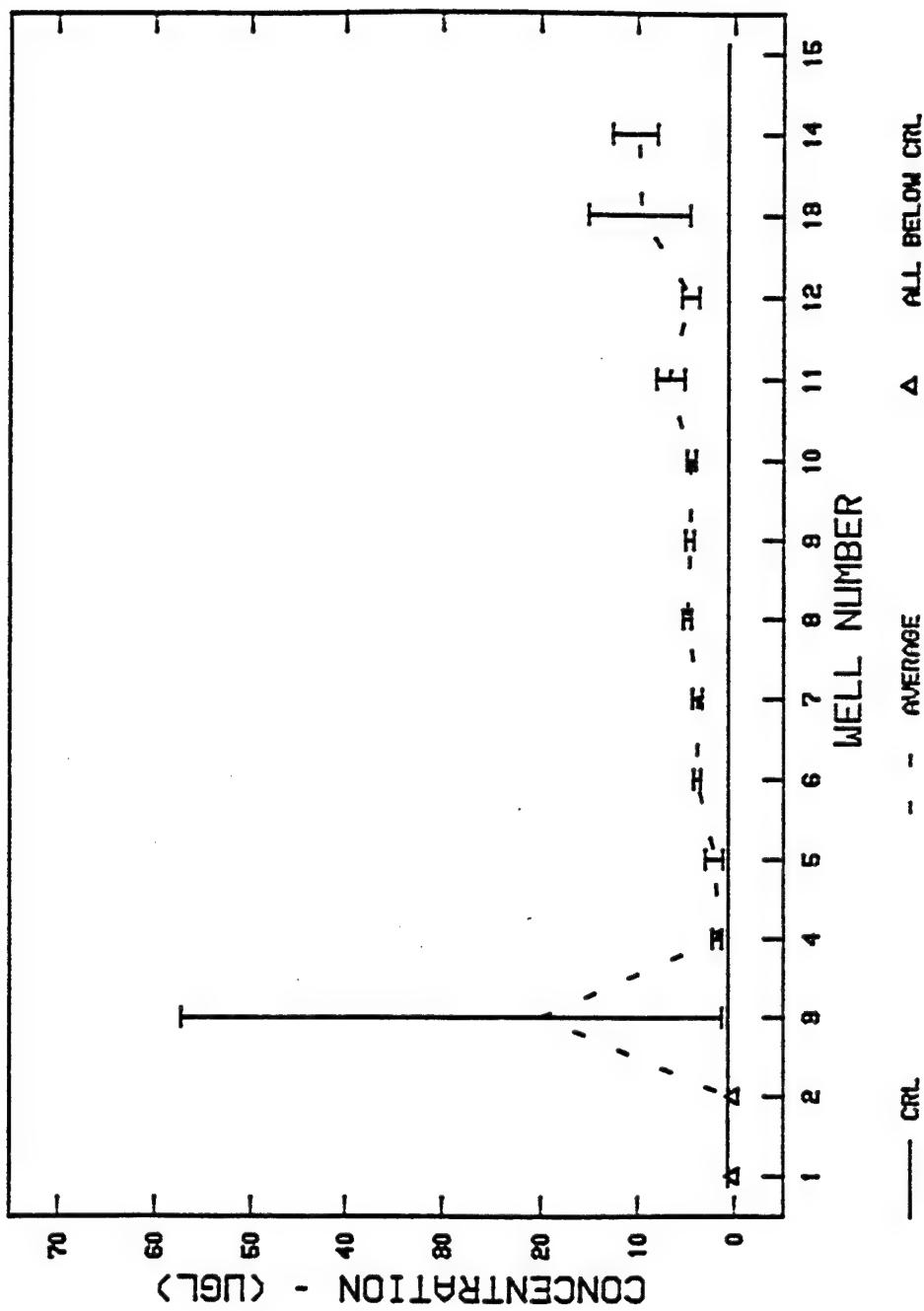


Figure 21. FY89 Diisopropylmethylphosphonate (DIMP) concentrations in NWBS dewatering wells

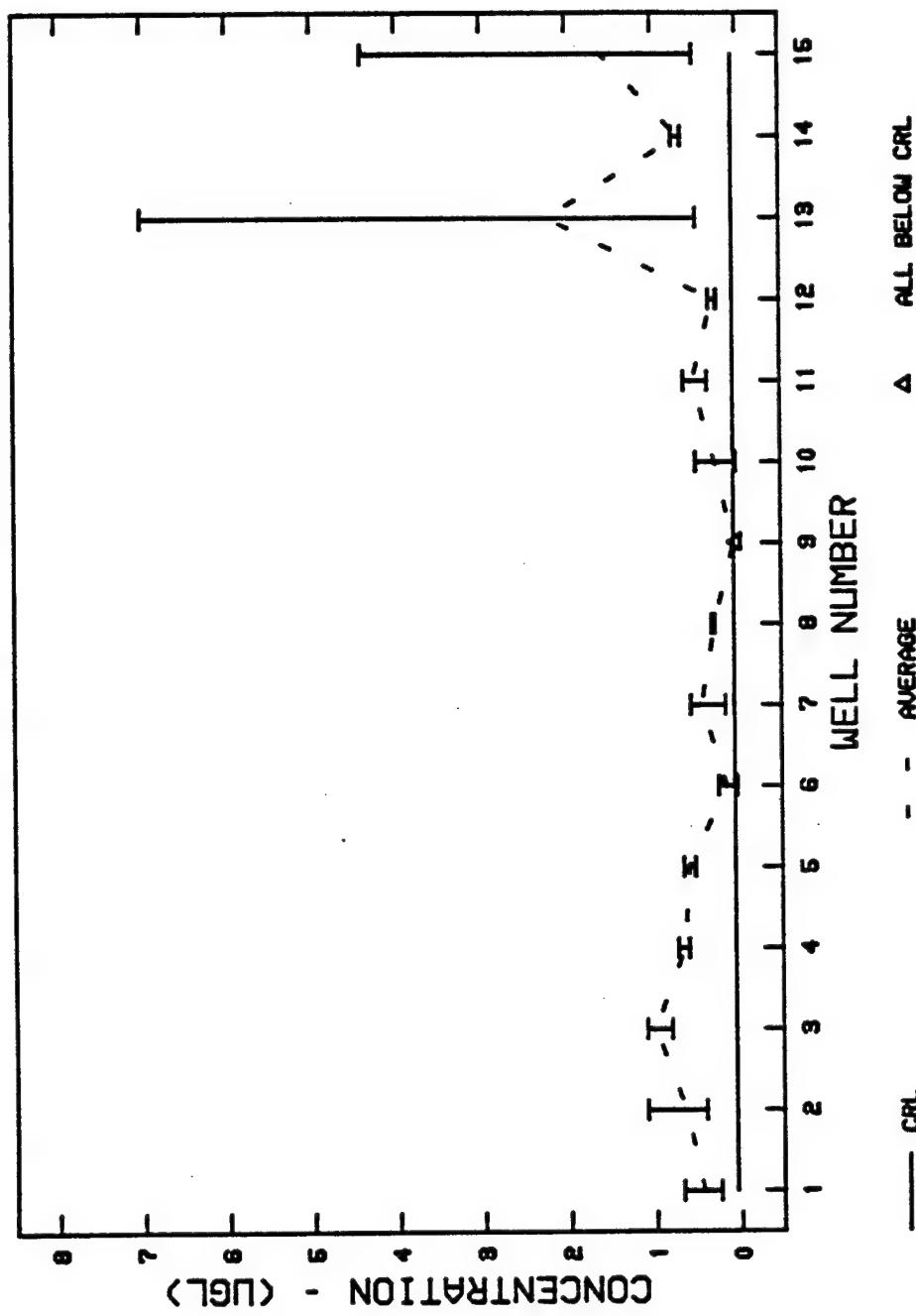


Figure 22. FY89 Dieldrin concentration in NWBS dewatering wells

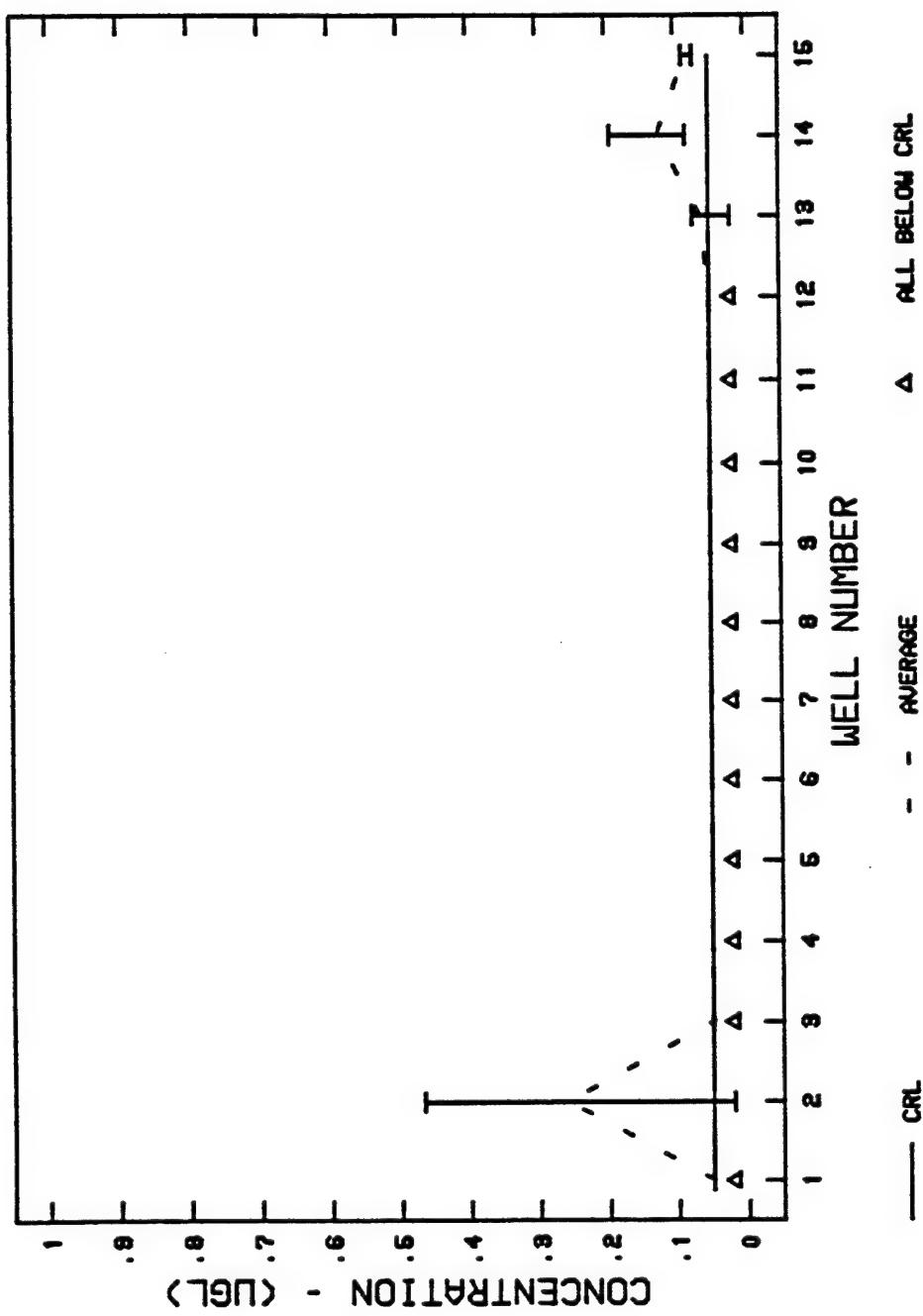


Figure 23. FY89 Endrin concentrations in NWBS dewatering wells

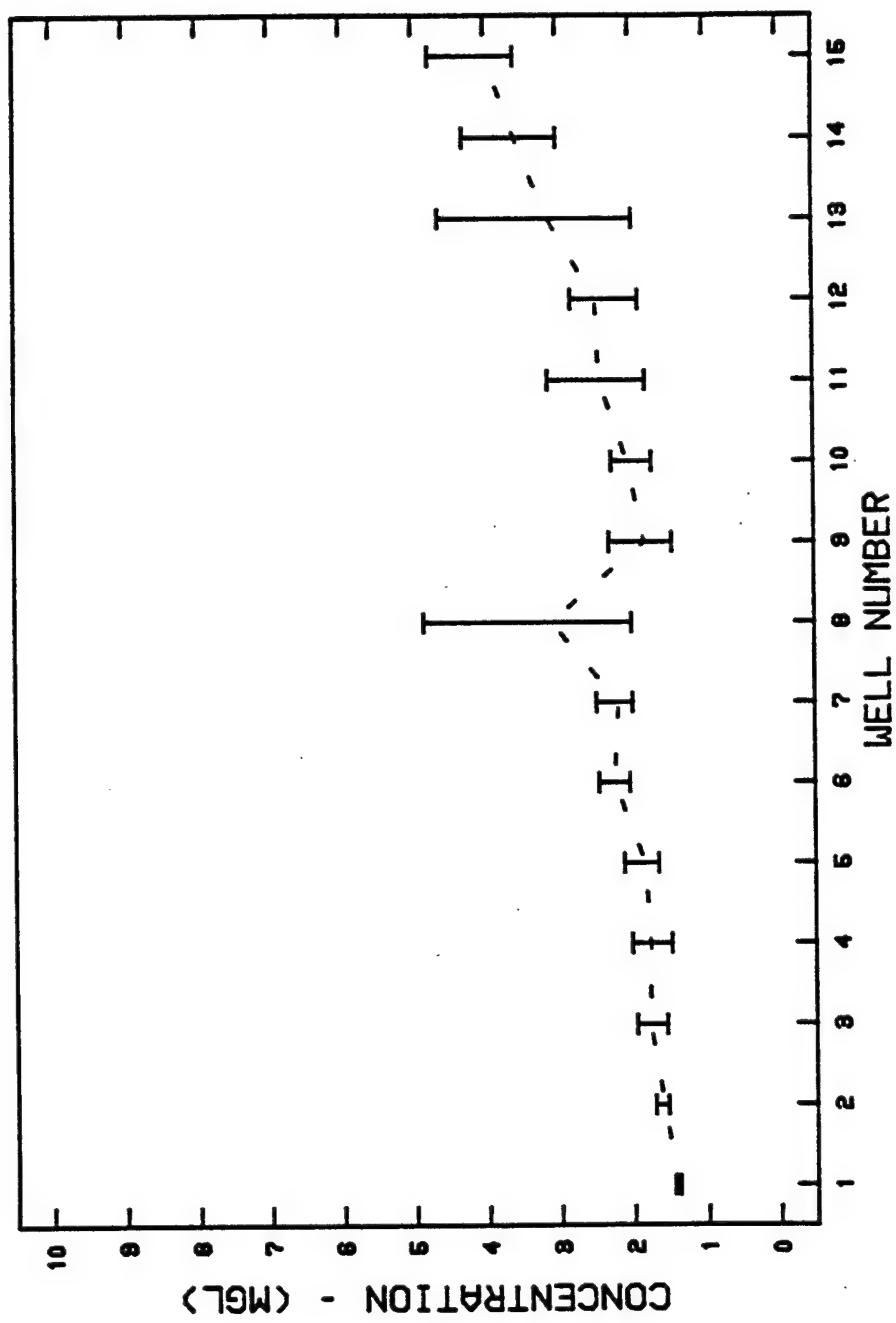


Figure 24. FY89 Fluoride concentrations in NWBS dewatering wells

Isodrin

43. During FY89, concentrations of isodrin (Figure 25) above the CRL were found in samples collected from wells located generally along the northeast half of the system. A maximum concentration of approximately 0.65 ppb was reported for well No. 10. Isodrin concentrations along the southwest end of the line were generally below the CRL. No isodrin concentrations were reported for the dewatering wells in FY88.

Trichloroethylene

44. During FY89, concentrations of trichloroethylene (Figure 26) above the CRL were found in samples collected from wells located along the northeast end of the system. A maximum concentration of approximately 1.4 ppb was reported for well No. 14. Trichloroethylene concentrations were reported to be below the CRL for well No.'s 1 through 10 and No. 12. No trichloroethylene concentrations were reported for the dewatering wells in FY88.

Summary of Dewatering Well Data

45. Based on the contaminant concentration data collected for the dewatering wells during FY89, it appears that the highest concentrations of aldrin, DCPD, dieldrin, endrin, isodrin, and trichloroethylene were found along either or both ends of the dewatering well line with essentially no concentrations above their respective CRL's found along the center of the line. With respect to chloride, DIMP, and fluoride, the concentrations increased from southwest to northeast along the line. Of those contaminants for which values were not reported in FY88, isodrin and trichloroethylene concentrations above their respective CRL's with wells along the northeast end of the line while DCPD concentrations above the CRL were found along the southwest end of the line.

46. With respect to overall trends in the FY89 distributions of the individual contaminants reported in FY88, there was not a lot of change. However, additional contaminants with concentrations above their respective CRL's have been found on both ends of the system. With respect to FY89 concentrations of contaminants reported in FY88, fluoride remained about the same while aldrin, and dieldrin concentrations increased slightly. Chloride and DIMP concentrations decreased somewhat.

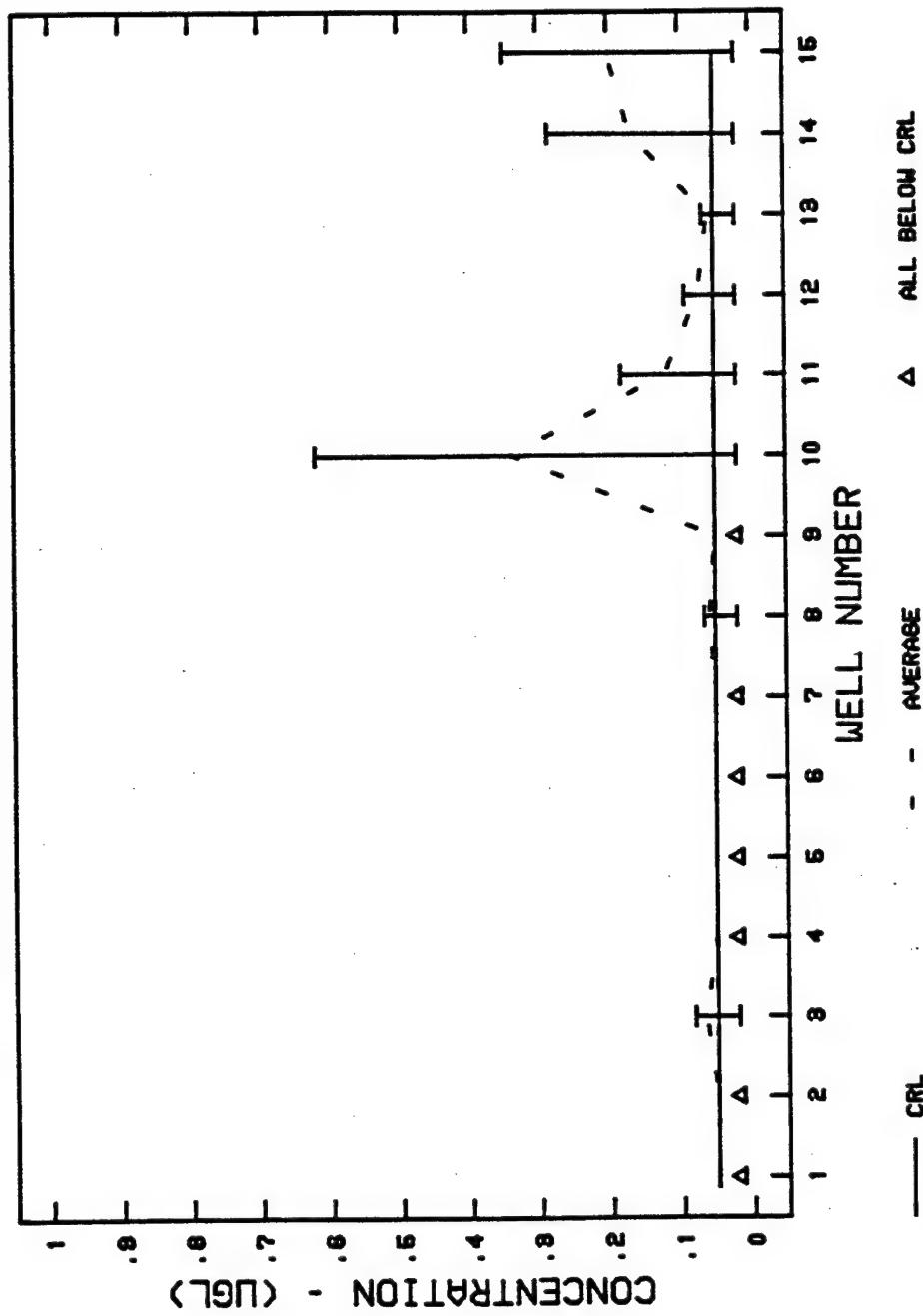


Figure 25. FY89 Isodrin concentrations in NWBS dewatering wells

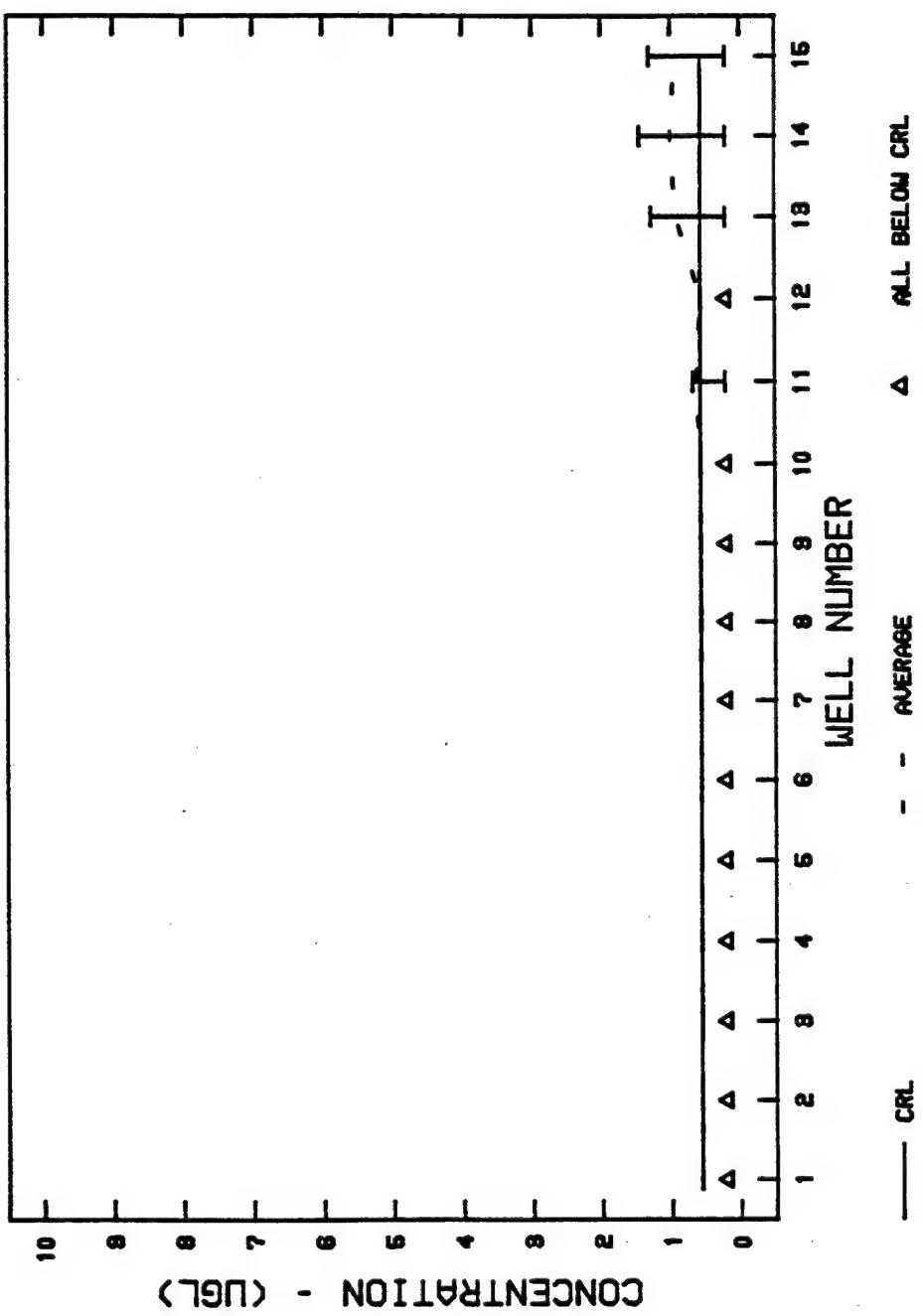


Figure 26. FY89 Trichloroethylene (TRCLE) concentrations in NWBS dewatering wells

PART IV: GROUND-WATER FLOW EVALUATION

Geology and Hydrogeology

Geological Setting

47. Description of the geology at the Northwest Boundary area has been presented adequately in previous assessment reports and is not repeated here.

Start of Year Alluvial Hydrogeology

48. Hydrogeological conditions in alluvium at the start of FY89 were in continuity with conditions for the past few years. Figure 27 shows the configuration of the water table in October 1988. The map is generated mostly by computer and is distinct in appearance from maps in previous years which were contoured by hand with geological interpretation.\*

End of Year Alluvial Hydrogeology

49. Hydrogeological conditions in alluvium at the end of FY89 are shown in Figure 28. Readings on about October 13, 1989 are representative of the end of FY89 despite falling two weeks into FY90.

50. Comparison of the map for the end of the year with the map for the start of the year (Figure 27) reveals the major rise in water table that took place on both sides of the barrier. The rise is shown separately in Figure 29. Water continued to rise through most of the year as evident in the

---

\* The computer program for contouring entitled MCCON, was developed by the Geotechnical Laboratory, WES. The program is written in FORTRAN and operates on a PC ("286" or "386" IBM compatibles). MCCON is used to prepare contour maps and to prepare section profiles. The program will accept up to 999 data (x,y,z) triplets. MCCON was chosen for this project because it is capable of handling the discontinuous behavior of the water table in the vicinity of the slurry walls. The program generates non-intersecting triangles which connect each and every data (node) point. Triangle generation ceases after all of the nodes are used as a vertex of at least one triangle and the mesh of triangles encompasses all of the nodes in a convex fashion (i.e., the outer edges of the triangle mesh form a convex shape). The resulting mesh will contain no areas that are not included within a triangle (i.e., the mesh will contain no "holes"). Typically, a set of 100 nodes (on a "386" machine with math coprocessor and EGA card) will require 10 seconds to generate the triangle mesh; a set of 400 nodes, 56 seconds; and 900 nodes, 165 seconds. The time devoted to contour line drawing (on the screen) is typically an additional 20-30 seconds. The contour lines are drawn as a series of connecting straight line segments and circular segments. This combination yields an aesthetically pleasing appearance to the resulting contour map.

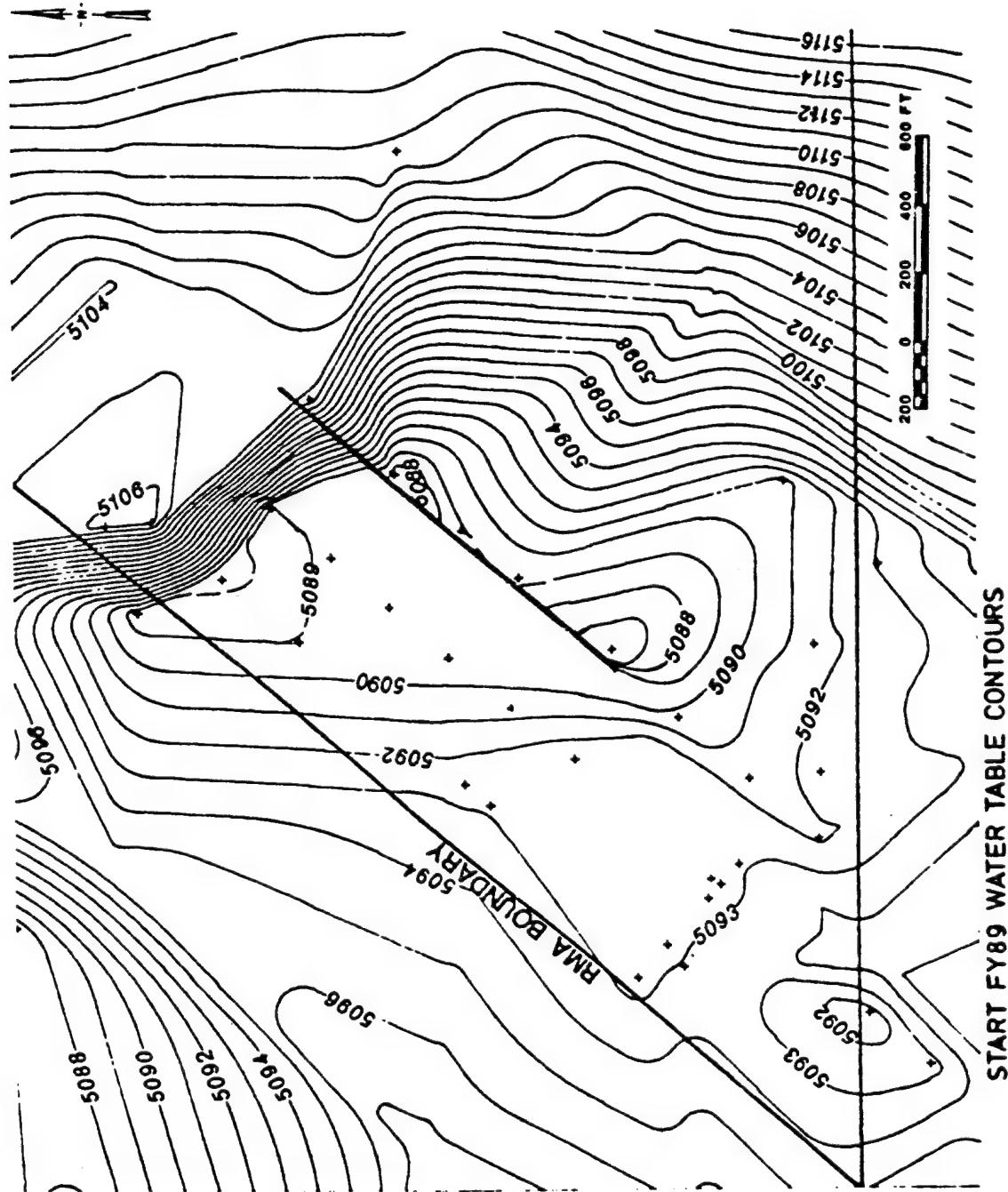


Figure 27. Water-table configuration (ft) at start of FY89

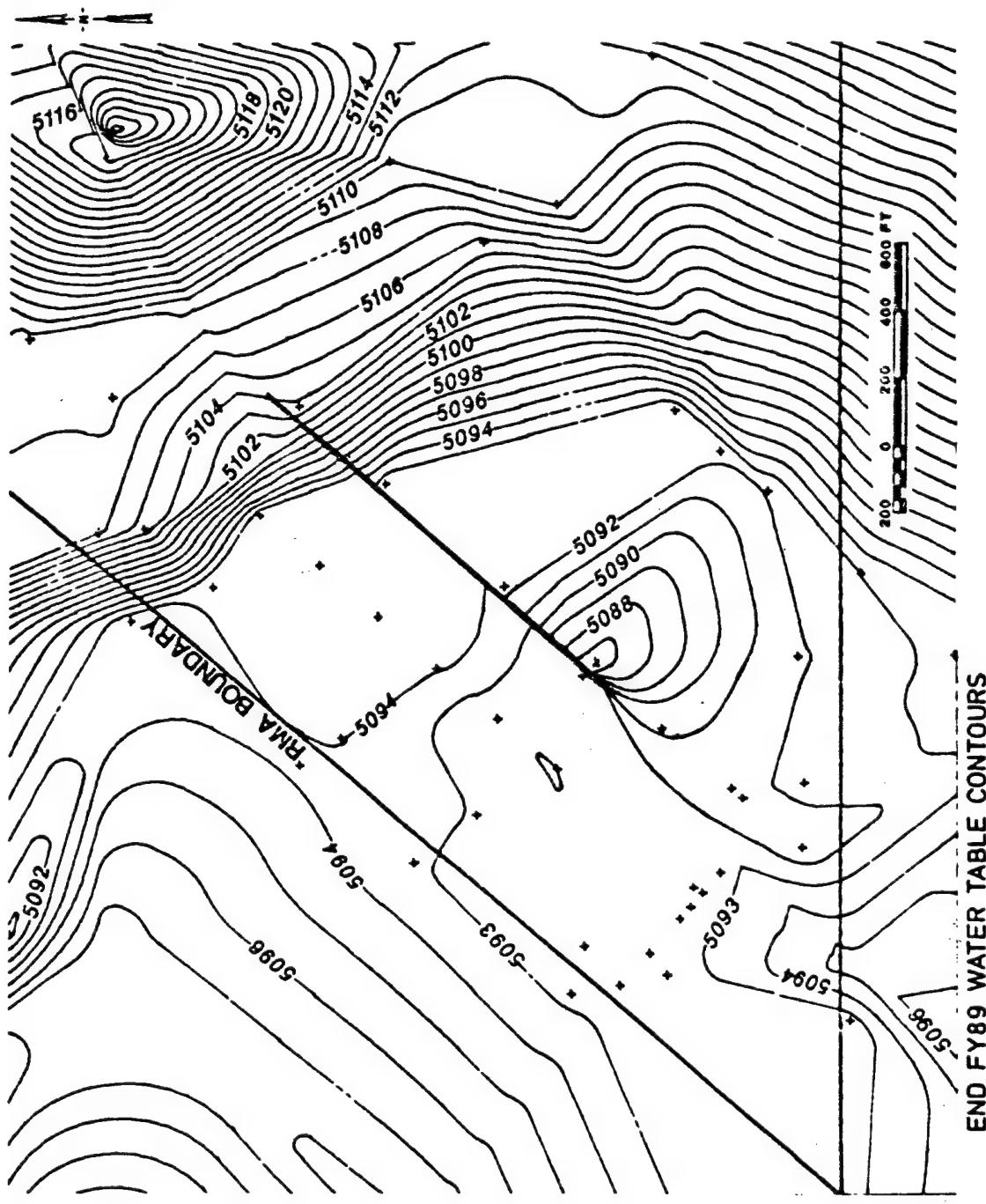


Figure 28. Water-table configuration (ft) at end of FY89

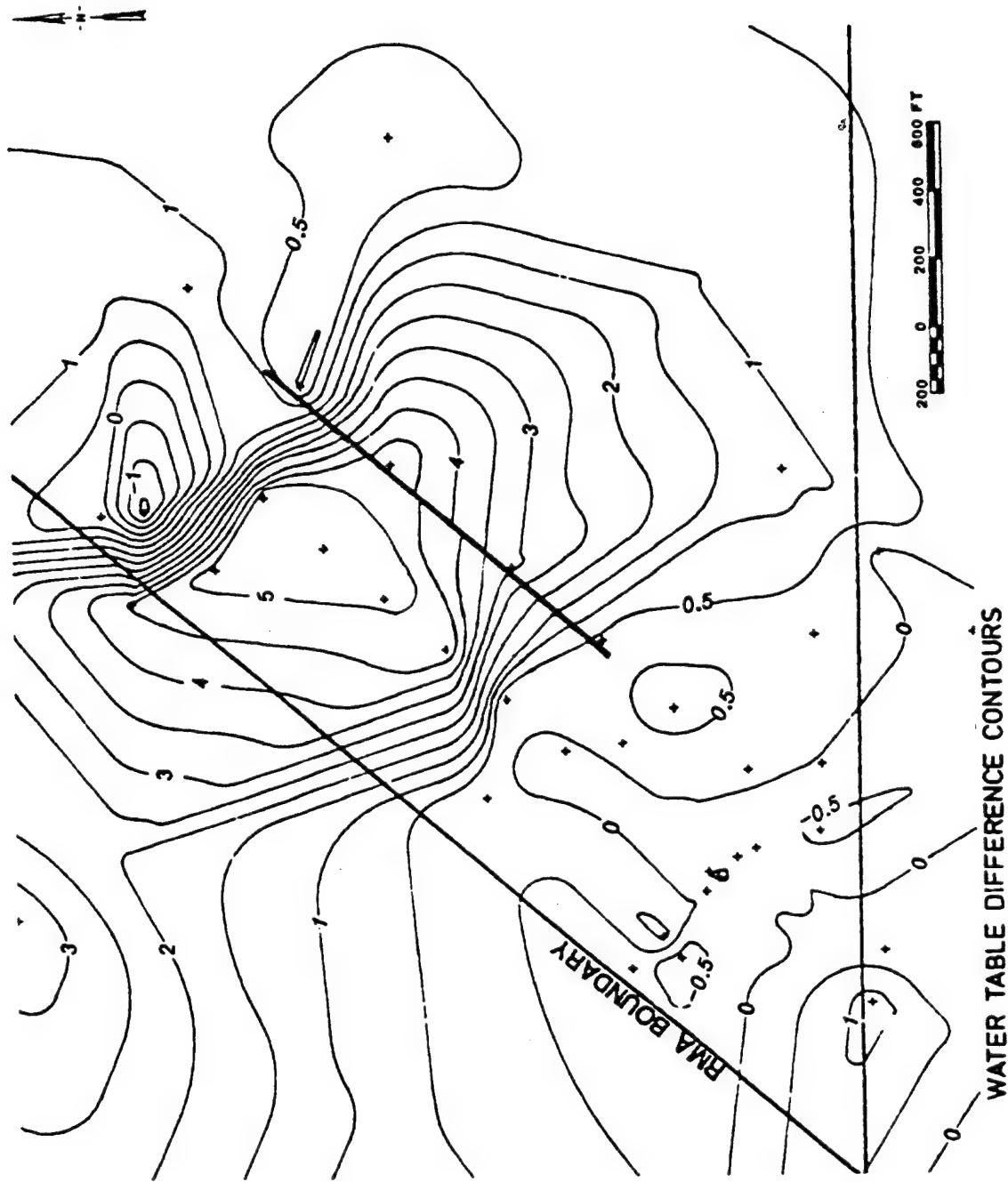


Figure 29. Water-table difference (ft) between start and end of FY89

rise of quarterly profiles among Figures 30 through 35. The rise was as great as 4 ft near the barrier as evident in Figures 34 and 35.

51. The rise in water table resulted from operational increases in flow rates and total flow to recharge wells at the northeast half of the system. This management action corrected a previously recognized condition of low water table immediately northwest of the barrier and associated unfavorable head gradient across the barrier. Contemporaneously, the water table rose substantially southeast of the barrier. The mounding of the water table resulting from the increased recharging impeded ground-water flow around the barrier and led to this buildup.

#### Denver Hydrogeology

52. Only a relatively few monitoring wells are screened in the Denver formation and these are further divided among at least three distinct aquifers. Accordingly no area-wide contouring of piezometric surfaces is meaningful as yet. A general parallelism between configurations in the Denver aquifers and in the alluvial aquifer has been established, but refinement must await the addition of more Denver monitoring wells.

#### Ground-water Hydrology

##### Long-Term Trend

53. Indications of a long-term decline in the water table were in accord with the decline indicated in the previous several years (TOD 1989). In Figure 31 the decline is evident among monitoring wells in Section 27 away from the influence of the NWBS. The range of levels for FY88 is shown for comparison. A similar decline is evident along profile 2 (Figure 32). The decline is not related to droughty conditions since annual precipitation has recently been above the average 15 in. as follows:

| <u>FY</u> | <u>Annual<br/>Precipitation<br/>(in.)</u> |
|-----------|---|
| 85        | 17.82                                     |
| 86        | 11.54                                     |
| 87        | 19.05                                     |
| 88        | 17.55                                     |
| 89        | 15.27                                     |

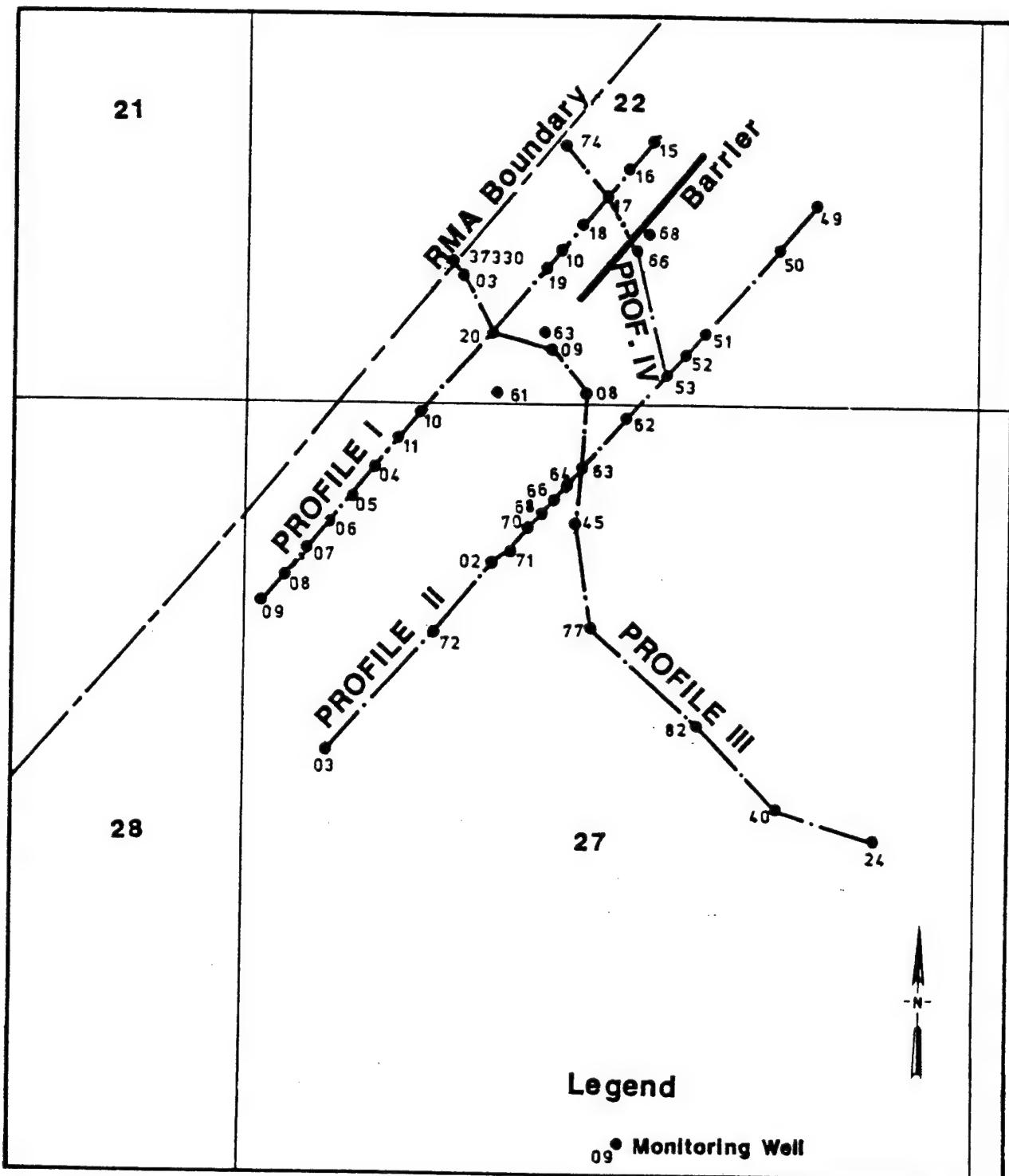


Figure 30. Locations of water-table profiles

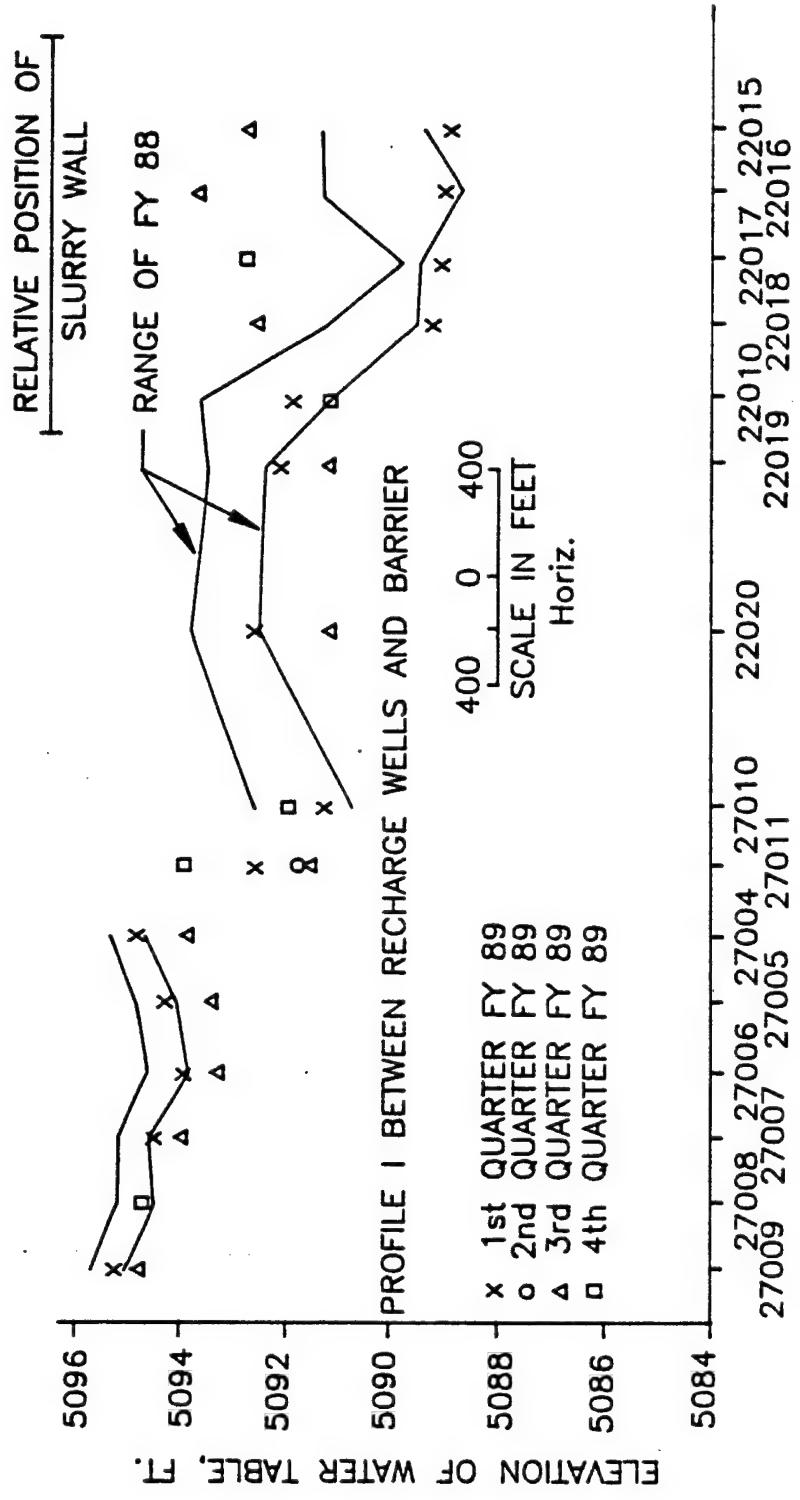


Figure 31. Profile I for FY 89

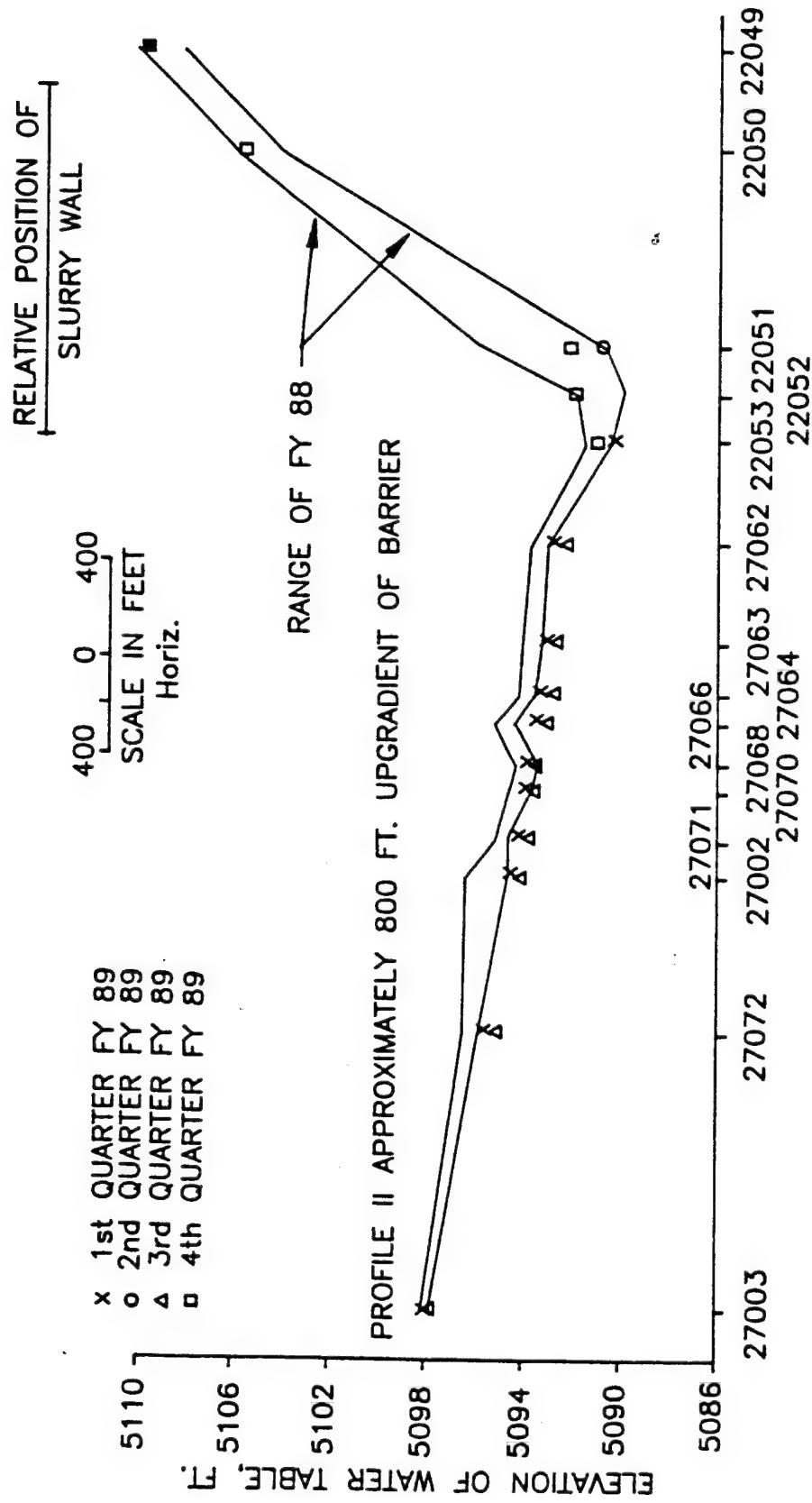


Figure 32. Profile II for FY 89

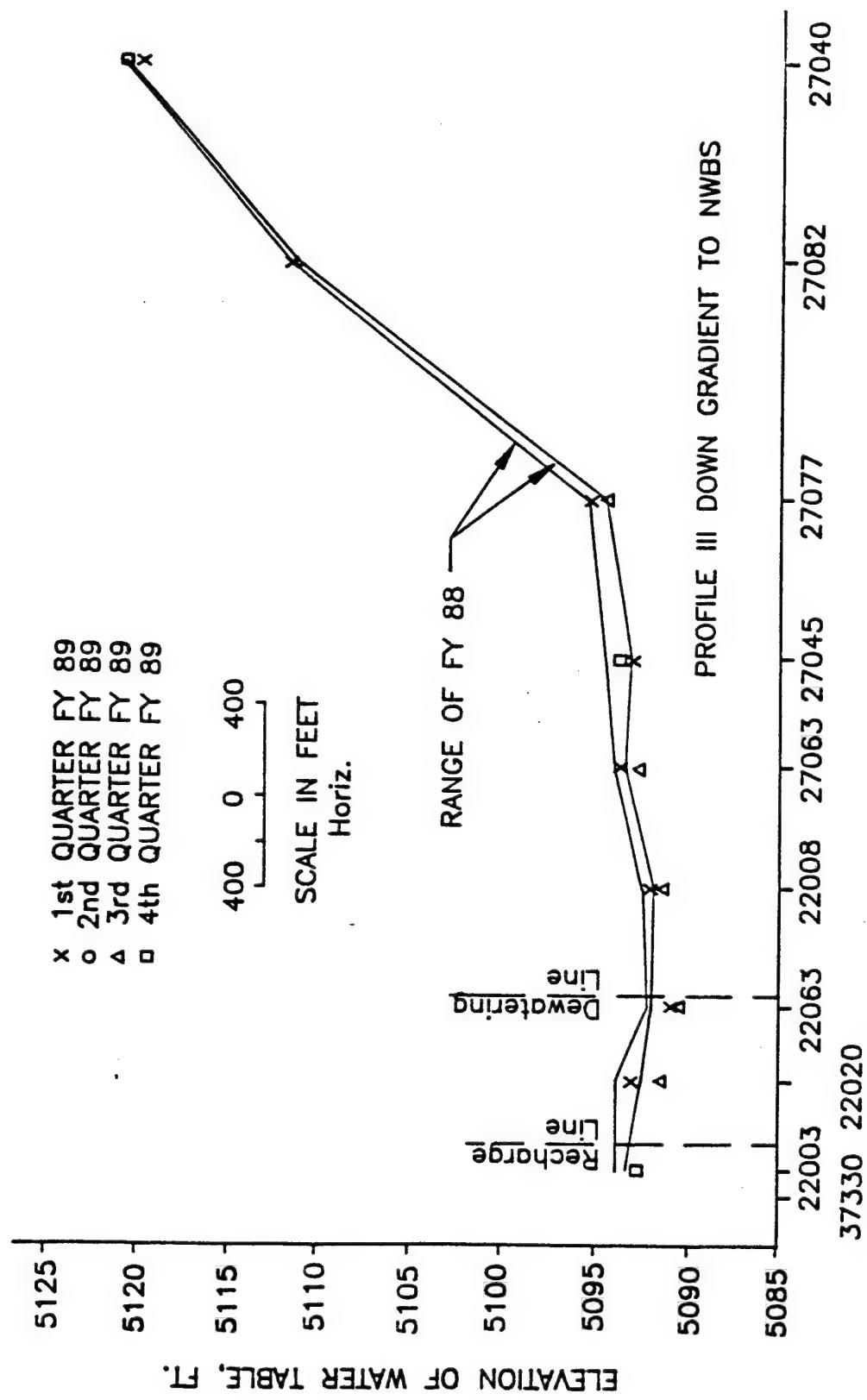


Figure 33. Profile III for FY 89

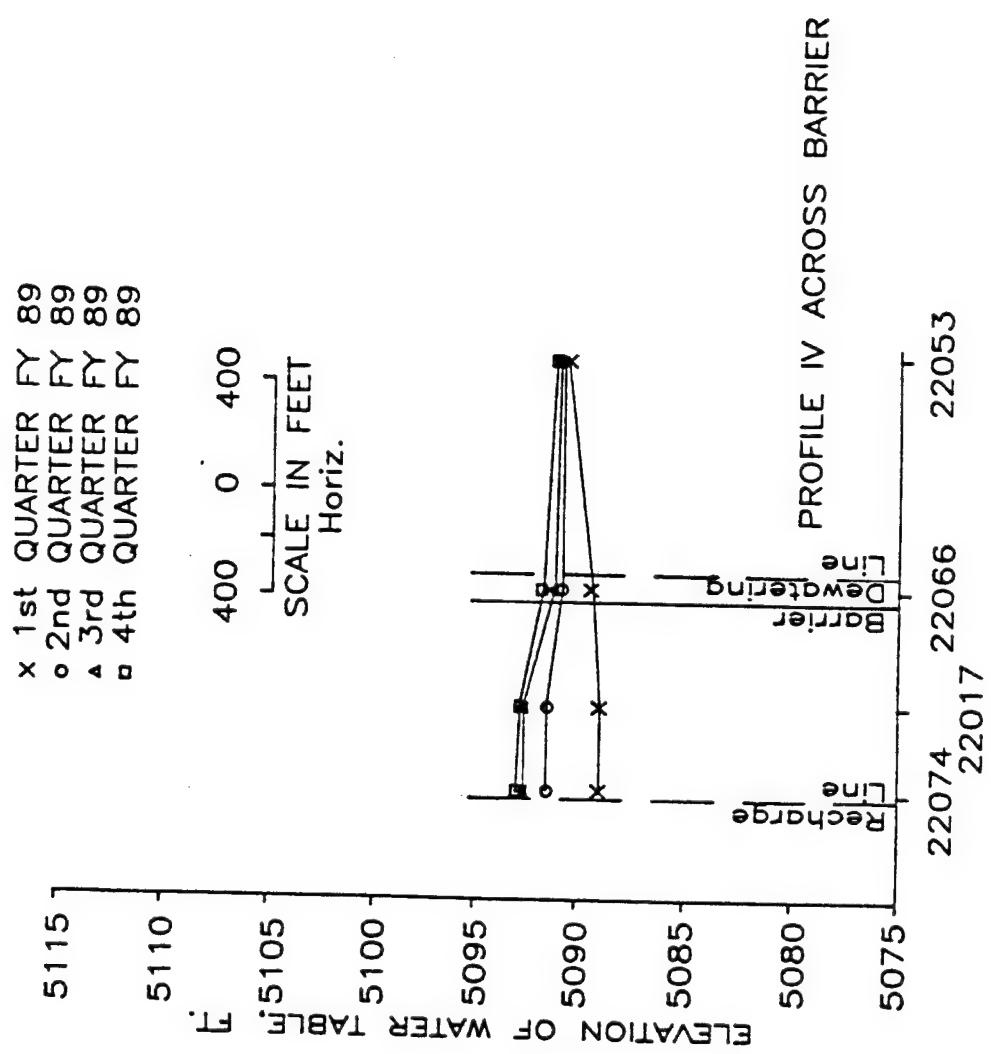


Figure 34. Profile IV for FY 89

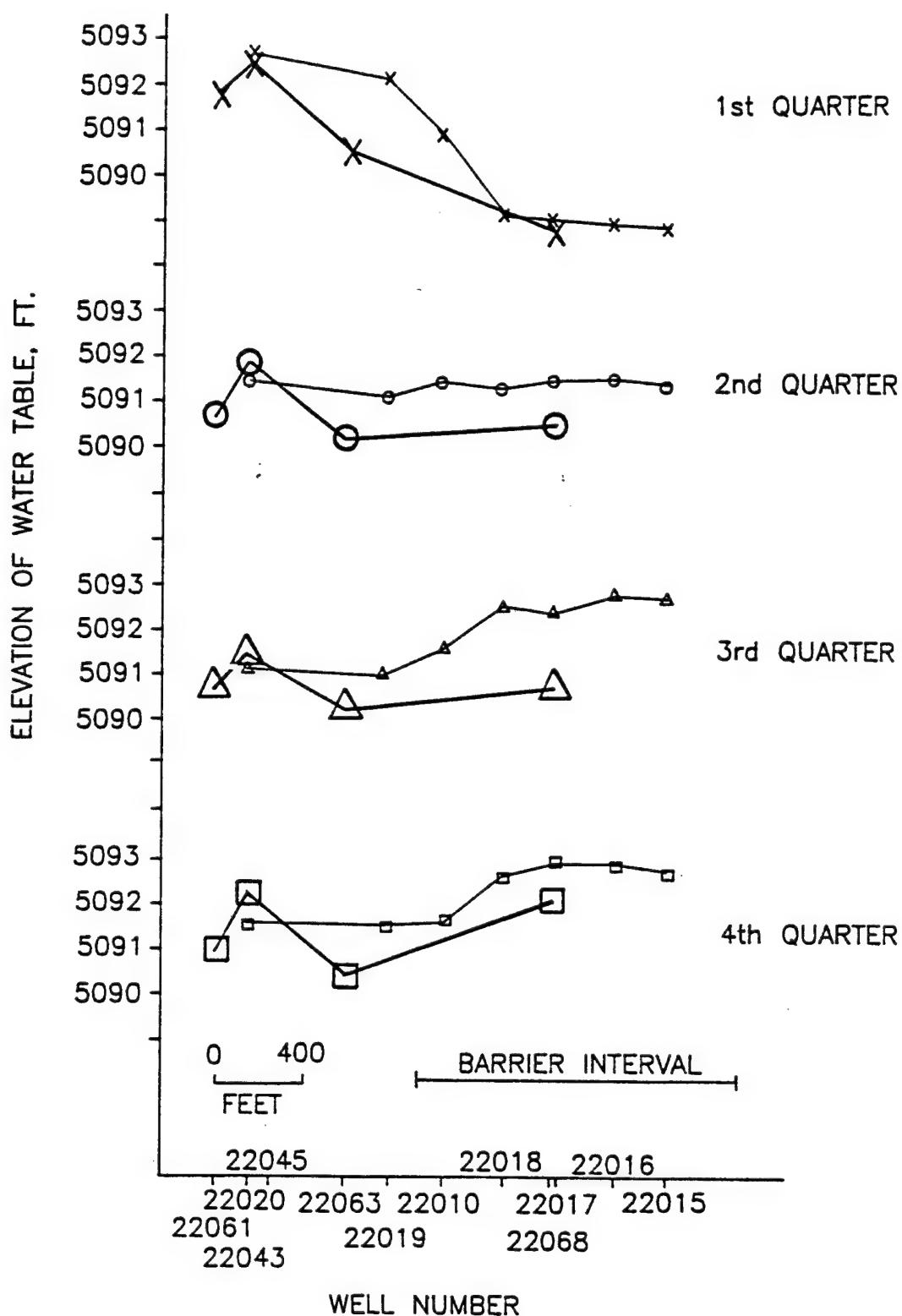


Figure 35. Comparison of ground-water levels on northwest side (light symbols) and southeast side (heavy symbols) of barrier

#### Seasonal Trend

54. Seasonal fluctuations are also evident in the behavior of the water table. Levels quarter by quarter are shown in Figures 31 through 33. Close examination reveals that the levels rose to a high in the first quarter, presumably with the onset of winter. Similarly, the low for the year came in the third quarter with the onset of the summer. This seasonal effect is best seen in Figure 32 but can also be found in Figures 31 and 33.

#### Recharge Function

55. The NWBS is considered to be operating most efficiently when there is a reverse water-table gradient southeastward. Figure 34 shows that a condition near neutral (neither northwest or southeast) was maintained throughout FY89. Figure 35 compares water-table conditions across the barrier from a different perspective. The water table in the profile northwest of the barrier from a different perspective. The water table in the profile northwest of the barrier alignment tended to be higher than along the parallel profile situated southeast of the barrier alignment.

## PART V: CONCLUSIONS

56. Based on the evaluation of the FY89 operations data for the Northwest Boundary System, the following conditions can be made:

- a. Ground-water levels in the NWBS area were stable for FY89.
- b. An increased flow of recharge water was directed by management decision to the northeast end of the system to raise the water table.
- c. The desired neutral to southeastward gradient was maintained across the system throughout the year.
- d. The water table showed a small decline at locations away from the influence of the system.
- e. The treatment system in general effectively removed organic contaminants from the influent to the system. Chloroform was not as effectively removed by the treatment system as were the other organic contaminants monitored at the NWBS. Inorganic contaminants, such as chloride and fluoride, were not removed by the treatment system.

## REFERENCES

Omaha District. 1986. "Construction Foundation Report; Northwest Boundary, RMA Containment/Treatment System," U.S. Army Engineer District, Omaha.

Program Manager Staff Office (PMSO). 1987. "Northwest Boundary Containment/Treatment System Baseline Conditions, System Startup and Operational Assessment Report for FY85/86," Rocky Mountain Arsenal Information Center Reference Library Number 88054R01, Rocky Mountain Arsenal, Commerce City, Colorado.

Program Manager for Rocky Mountain Arsenal (PMRMA). 1988. "Northwest Boundary Containment/Treatment System Operational Assessment Report, FY87, Final Report," Rocky Mountain Arsenal Information Center Reference Library Number 89263R02, Rocky Mountain Arsenal, Commerce City, Colorado.

Stollar and Associates. 1989. "Comprehensive Monitoring Program: Annual Ground Water Report for 1988 Final Report," Rocky Mountain Arsenal Information Center Library No. 89213R01, Rocky Mountain Arsenal, Commerce City, Colorado.

Program Manager for Rocky Mountain Arsenal (PMRMA). 1989. "Northeast Boundary Containment/Treatment System Operational Assessment, FY88," Final Report." Rocky Mountain Arsenal Information Center Reference Library No. 90061R02, Rocky Mountain Arsenal, Commerce city, Colorado.

**APPENDIX A**  
**FLOW DATA**

D.P.A.

**NORTHWEST BOUNDARY TREATMENT PLANT**  
**FY 89 WEEKLY FLOWS FOR ADSORBERS**

| DATE     | 1       |        | 2       |        | 3       |        | TOTAL   |        |
|----------|---------|--------|---------|--------|---------|--------|---------|--------|
|          | GAL(00) | GPM    | GAL(00) | GPM    | GAL(00) | GPM    | GAL(00) | GPM    |
| 10/07/88 | 0       | 0.00   | 3,918   | 388.69 | 3,000   | 297.62 | 6,918   | 686.31 |
| 10/14/88 | 0       | 0.00   | 3,936   | 390.28 | 3,260   | 323.25 | 7,196   | 713.53 |
| 10/21/88 | 0       | 0.00   | 3,973   | 394.54 | 3,192   | 316.98 | 7,165   | 711.52 |
| 10/28/88 | 0       | 0.00   | 4,002   | 396.63 | 3,162   | 313.38 | 7,164   | 710.01 |
| 11/04/88 | 0       | 0.00   | 3,552   | 350.64 | 3,018   | 297.93 | 6,570   | 648.57 |
| 11/11/88 | 0       | 0.00   | 3,585   | 357.78 | 3,179   | 317.27 | 6,764   | 675.05 |
| 11/18/88 | 0       | 0.00   | 3,584   | 352.93 | 3,258   | 320.83 | 6,842   | 673.76 |
| 11/25/88 | 0       | 0.00   | 3,557   | 353.05 | 3,083   | 306.00 | 6,640   | 659.05 |
| 12/02/88 | 0       | 0.00   | 3,188   | 316.11 | 2,948   | 292.32 | 6,136   | 608.43 |
| 12/09/88 | 0       | 0.00   | 3,544   | 351.24 | 2,731   | 270.66 | 6,275   | 621.90 |
| 12/16/88 | 0       | 0.00   | 3,672   | 364.47 | 2,717   | 269.68 | 6,389   | 634.15 |
| 12/23/88 | 0       | 0.00   | 3,614   | 358.89 | 2,484   | 246.67 | 6,098   | 605.56 |
| 12/30/88 | 0       | 0.00   | 3,672   | 363.38 | 2,513   | 248.69 | 6,185   | 612.07 |
| 01/06/89 | 0       | 0.00   | 3,541   | 352.16 | 2,399   | 238.59 | 5,940   | 590.75 |
| 01/13/89 | 0       | 0.00   | 3,551   | 351.34 | 2,700   | 267.14 | 6,251   | 618.48 |
| 01/20/89 | 0       | 0.00   | 3,520   | 349.62 | 2,299   | 228.35 | 5,819   | 577.97 |
| 01/27/89 | 0       | 0.00   | 3,496   | 347.17 | 2,064   | 204.97 | 5,560   | 552.14 |
| 02/03/89 | 0       | 0.00   | 3,486   | 345.32 | 2,194   | 217.34 | 5,680   | 562.66 |
| 02/10/89 | 0       | 0.00   | 2,998   | 298.31 | 2,449   | 243.68 | 5,447   | 541.99 |
| 02/17/89 | 916     | 90.87  | 2,003   | 198.71 | 3,124   | 309.92 | 6,043   | 599.50 |
| 02/24/89 | 3,711   | 367.97 | 0       | 0.00   | 2,989   | 296.38 | 6,700   | 664.35 |
| 03/03/89 | 3,805   | 377.11 | 0       | 0.00   | 2,973   | 294.65 | 6,778   | 671.76 |
| 03/10/89 | 3,636   | 361.25 | 0       | 0.00   | 2,908   | 288.92 | 6,544   | 650.17 |
| 03/17/89 | 3,525   | 349.36 | 0       | 0.00   | 3,027   | 300.00 | 6,552   | 649.36 |
| 03/24/89 | 3,522   | 349.06 | 0       | 0.00   | 2,856   | 283.05 | 6,378   | 632.11 |
| 03/31/89 | 3,849   | 380.71 | 0       | 0.00   | 2,897   | 286.55 | 6,746   | 667.26 |
| 04/07/89 | 3,472   | 344.27 | 0       | 0.00   | 3,143   | 311.65 | 6,615   | 655.92 |
| 04/14/89 | 3,206   | 321.73 | 0       | 0.00   | 3,672   | 368.49 | 6,878   | 690.22 |
| 04/21/89 | 3,231   | 320.38 | 0       | 0.00   | 3,879   | 384.63 | 7,110   | 705.01 |
| 04/28/89 | 3,337   | 331.22 | 0       | 0.00   | 3,698   | 367.05 | 7,035   | 698.27 |
| 05/05/89 | 3,498   | 346.34 | 0       | 0.00   | 3,452   | 341.78 | 6,950   | 688.12 |
| 05/12/89 | 3,604   | 358.25 | 0       | 0.00   | 3,120   | 310.14 | 6,724   | 668.39 |
| 05/19/89 | 3,462   | 342.77 | 0       | 0.00   | 3,211   | 317.92 | 6,673   | 660.69 |
| 05/26/89 | 3,274   | 325.45 | 0       | 0.00   | 3,334   | 331.41 | 6,608   | 656.86 |
| 06/02/89 | 3,366   | 333.93 | 0       | 0.00   | 3,244   | 321.83 | 6,610   | 655.76 |
| 06/09/89 | 3,177   | 315.18 | 0       | 0.00   | 3,370   | 334.33 | 6,547   | 649.51 |
| 06/16/89 | 3,317   | 329.07 | 0       | 0.00   | 3,508   | 348.02 | 6,825   | 677.09 |
| 06/23/89 | 3,523   | 348.64 | 0       | 0.00   | 3,226   | 319.25 | 6,749   | 667.89 |
| 06/30/89 | 3,477   | 345.80 | 0       | 0.00   | 3,103   | 308.60 | 6,580   | 654.40 |
| 07/07/89 | 3,301   | 326.51 | 0       | 0.00   | 2,953   | 292.09 | 6,254   | 618.60 |
| 07/14/89 | 3,607   | 354.32 | 0       | 0.00   | 2,347   | 230.55 | 5,954   | 584.87 |
| 07/21/89 | 3,470   | 348.74 | 0       | 0.00   | 2,628   | 264.12 | 6,098   | 612.86 |
| 07/28/89 | 3,537   | 350.20 | 0       | 0.00   | 2,773   | 274.55 | 6,310   | 624.75 |

D.P.A.

NORTHWEST BOUNDARY TREATMENT PLANT  
FY 89 WEEKLY FLOWS FOR ADSORBERS

| DATE     | 1       |        | 2       |        | 3       |        | TOTAL   |        |
|----------|---------|--------|---------|--------|---------|--------|---------|--------|
|          | GAL(00) | GPM    | GAL(00) | GPM    | GAL(00) | GPM    | GAL(00) | GPM    |
| 08/04/89 | 3,646   | 362.25 | 0       | 0.00   | 2,946   | 292.70 | 6,592   | 654.95 |
| 08/11/89 | 3,542   | 351.39 | 0       | 0.00   | 2,364   | 234.52 | 5,906   | 585.91 |
| 08/18/89 | 3,486   | 346.00 | 0       | 0.00   | 2,310   | 229.28 | 5,796   | 575.28 |
| 08/25/89 | 3,137   | 310.59 | 634     | 62.77  | 1,696   | 167.92 | 5,467   | 541.28 |
| 09/01/89 | 3,783   | 375.86 | 324     | 32.19  | 1,760   | 174.86 | 5,867   | 582.91 |
| 09/08/89 | 3,582   | 355.53 | 2,591   | 257.17 | 0       | 0.00   | 6,173   | 612.70 |
| 09/15/89 | 3,118   | 309.33 | 2,490   | 247.02 | 0       | 0.00   | 5,608   | 556.35 |
| 09/22/89 | 3,473   | 344.37 | 2,953   | 292.81 | 0       | 0.00   | 6,426   | 637.18 |
| 09/30/89 | 4,090   | 355.19 | 3,343   | 290.32 | 0       | 0.00   | 7,433   | 645.51 |

D.P.A.

NORTHWEST BOUNDARY TREATMENT PLANT  
FY 89 QUARTERLY FLOWS FOR ADSORBERS

| DATE    | 1       |        | 2       |        | 3       |        | TOTAL   |        |
|---------|---------|--------|---------|--------|---------|--------|---------|--------|
|         | GAL(00) | GPM    | GAL(00) | GPM    | GAL(00) | GPM    | GAL(00) | GPM    |
| 1st QTR | 0       | 0.00   | 47,797  | 364.51 | 38,545  | 293.94 | 86,342  | 658.45 |
| 2nd QTR | 22,964  | 175.10 | 22,595  | 172.51 | 34,879  | 266.12 | 80,438  | 613.73 |
| 3rd QTR | 43,944  | 335.62 | 0       | 0.00   | 43,960  | 335.78 | 87,904  | 671.39 |
| 4th QTR | 45,772  | 345.41 | 12,335  | 90.94  | 21,777  | 166.20 | 79,884  | 602.55 |
| ANNUAL  | 112,680 | 214.03 | 82,727  | 156.99 | 139,161 | 265.51 | 334,568 | 636.53 |

APPENDIX B  
TREATMENT PLANT WATER QUALITY DATA STATISTICAL SUMMARY  
AND GC/MS ANALYSIS

## NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 89

| SAMPLE DATE | 111TCE ug/l | 112TCE ug/l | 11DCE ug/l | 11DCLE ug/l | 12DCE ug/l | 12DCLE ug/l | 13DMB ug/l | ALDRN ug/l | AS ug/l  |
|-------------|-------------|-------------|------------|-------------|------------|-------------|------------|------------|----------|
| 10/06/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 10/13/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 10/20/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 10/27/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 11/03/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 11/10/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 11/17/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 11/24/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 12/01/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 12/08/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 12/15/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | 0.107      | ....     |
| 12/22/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 12/29/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 01/04/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 01/11/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 01/18/89    | LT 0.760    | LT 0.780    | LT 1.700   | LT 0.730    | LT 0.760   | LT 1.100    | LT 1.320   | LT 0.050   | LT 2.350 |
| 01/25/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 02/01/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 02/08/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 02/15/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 02/22/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 03/01/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 03/08/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 03/15/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | 0.058      | ....     |
| 03/22/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 03/29/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 04/05/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 04/12/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 04/19/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 04/26/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/03/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/10/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/17/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/24/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/31/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 06/07/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 06/14/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 06/21/89    | LT 0.760    | LT 0.780    | LT 1.700   | LT 0.730    | LT 0.760   | LT 1.100    | LT 1.320   | LT 0.050   | LT 2.350 |
| 06/28/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 07/05/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 07/12/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 07/19/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 07/26/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 08/02/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 08/09/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 08/16/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 08/23/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 08/30/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 09/06/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 09/13/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 09/20/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 09/27/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |

LT = LESS THAN The Following Concentration  
ug/l = MICROGRAM PER LITER

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED  
mg/l = MILLIGRAM PER LITER

## NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 89

| SAMPLE DATE | ATZ ug/l | BCHPD ug/l | BTZ ug/l | C6H6 ug/l | CCL4 ug/l | CH2CL2 ug/l | CHCL3 ug/l | CHLORIDE mg/l | CL6CP ug/l |
|-------------|----------|------------|----------|-----------|-----------|-------------|------------|---------------|------------|
| 10/06/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 330           | ....       |
| 10/13/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | ....          | ....       |
| 10/20/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 310           | ....       |
| 10/27/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 330           | ....       |
| 11/03/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 290           | ....       |
| 11/10/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 330           | ....       |
| 11/17/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 320           | ....       |
| 11/24/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | ....          | ....       |
| 12/01/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 310           | ....       |
| 12/08/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 310           | ....       |
| 12/15/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 260           | ....       |
| 12/22/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 12/29/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | ....          | ....       |
| 01/04/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 01/11/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 250           | ....       |
| 01/18/89    | LT 4.030 | ....       | LT 5.000 | LT 1.050  | LT 0.990  | LT 7.400    | 21.650     | 257           | LT 0.048   |
| 01/25/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 290           | ....       |
| 02/01/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 260           | ....       |
| 02/08/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 02/15/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 02/22/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 03/01/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 03/08/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 250           | ....       |
| 03/15/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 03/22/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 03/29/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 04/05/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 04/12/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 04/19/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 04/26/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 05/03/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 05/10/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 280           | ....       |
| 05/17/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 05/24/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 260           | ....       |
| 05/31/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 06/07/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 210           | ....       |
| 06/14/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 06/21/89    | ....     | LT 5.900   | LT 5.000 | LT 1.050  | LT 0.990  | LT 7.400    | 47.800     | 267           | LT 0.048   |
| 06/28/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 300           | ....       |
| 07/05/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 360           | ....       |
| 07/12/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 290           | ....       |
| 07/19/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 07/26/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 08/02/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 08/09/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 260           | ....       |
| 08/16/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 220           | ....       |
| 08/23/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 190           | ....       |
| 08/30/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 290           | ....       |
| 09/06/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 09/13/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 260           | ....       |
| 09/20/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 280           | ....       |
| 09/27/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 310           | ....       |

LT = LESS THAN The Following Concentration  
 ug/l = MICROGRAM PER LITER

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED  
 mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 89

| SAMPLE DATE | CLC6H5 ug/l | CLDAN ug/l | CPMS ug/l | CPMSO ug/l | CPMSO2 ug/l | DBCP ug/l | DCPD ug/l | DDVP ug/l | DIMP ug/l |
|-------------|-------------|------------|-----------|------------|-------------|-----------|-----------|-----------|-----------|
| 10/06/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | ....      | ....      | 3.550     |
| 10/13/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | ....      | ....      | 3.430     |
| 10/20/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | ....      | LT 5.000  | ....      | ....      |
| 10/27/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.660     |
| 11/03/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.660     |
| 11/10/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.570     |
| 11/17/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.610     |
| 11/24/88    | ....        | ....       | ....      | ....       | ....        | ....      | ....      | ....      | ....      |
| 12/01/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.620     |
| 12/08/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.140     |
| 12/15/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.350     |
| 12/22/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.260     |
| 12/29/88    | ....        | ....       | ....      | ....       | ....        | ....      | ....      | ....      | ....      |
| 01/04/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.360     |
| 01/11/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.040     |
| 01/18/89    | LT 0.820    | LT 0.095   | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | LT 0.384  | 3.160     |
| 01/25/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.950     |
| 02/01/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.280     |
| 02/08/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.010     |
| 02/15/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.470     |
| 02/22/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.620     |
| 03/01/89    | ....        | ....       | ....      | ....       | ....        | ....      | LT 5.000  | ....      | 2.840     |
| 03/08/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.680     |
| 03/15/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.460     |
| 03/22/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | ....      | ....      | 2.730     |
| 03/29/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.780     |
| 04/05/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.570     |
| 04/12/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.740     |
| 04/19/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.960     |
| 04/26/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.190     |
| 05/03/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.540     |
| 05/10/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.525     |
| 05/17/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.230     |
| 05/24/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.640     |
| 05/31/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.280     |
| 06/07/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.140     |
| 06/14/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.340     |
| 06/21/89    | LT 0.820    | LT 0.095   | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.573     |
| 06/28/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.590     |
| 07/05/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.010     |
| 07/12/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.930     |
| 07/19/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 860       |
| 07/26/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.220     |
| 08/02/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.990     |
| 08/09/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.220     |
| 08/16/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.800     |
| 08/23/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.010     |
| 08/30/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.040     |
| 09/06/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.410     |
| 09/13/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.000     |
| 09/20/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | ....      | ....      | 1.970     |
| 09/27/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | ....      |

LT = LESS THAN The Following Concentration

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER

mg/l = MILLIGRAM PER LITER

## NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 89

| SAMPLE DATE | DITH ug/l | DLDRN ug/l | DMDS ug/l | ENDRN ug/l | ETC6H5 ug/l | FLUORIDE mg/l | ISODR ug/l | MEC6H5 ug/l | MLTHN ug/l |
|-------------|-----------|------------|-----------|------------|-------------|---------------|------------|-------------|------------|
| 10/06/88    | LT 1.340  | 0.324      | ....      | LT 0.050   | ....        | 2.510         | LT 0.051   | ....        | ....       |
| 10/13/88    | LT 1.340  | 0.318      | ....      | LT 0.050   | ....        | ....          | LT 0.051   | ....        | ....       |
| 10/20/88    | LT 1.340  | ....       | ....      | ....       | ....        | 2.310         | ....       | ....        | ....       |
| 10/27/88    | LT 1.340  | 0.282      | ....      | LT 0.050   | ....        | 2.550         | LT 0.051   | ....        | ....       |
| 11/03/88    | LT 1.340  | 0.278      | ....      | LT 0.050   | ....        | 2.470         | LT 0.051   | ....        | ....       |
| 11/10/88    | LT 1.340  | 0.288      | ....      | LT 0.050   | ....        | 2.510         | LT 0.051   | ....        | ....       |
| 11/17/88    | LT 1.340  | 0.346      | ....      | LT 0.050   | ....        | 2.720         | LT 0.051   | ....        | ....       |
| 11/24/88    | ....      | ....       | ....      | ....       | ....        | ....          | ....       | ....        | ....       |
| 12/01/88    | LT 1.340  | 0.086      | ....      | 0.046      | ....        | 2.670         | 0.085      | ....        | ....       |
| 12/08/88    | LT 1.340  | 0.417      | ....      | LT 0.050   | ....        | 2.830         | 0.086      | ....        | ....       |
| 12/15/88    | LT 1.340  | 0.654      | ....      | LT 0.050   | ....        | 2.440         | 0.077      | ....        | ....       |
| 12/22/88    | LT 1.340  | 0.377      | ....      | LT 0.050   | ....        | 2.270         | LT 0.051   | ....        | ....       |
| 12/29/88    | ....      | ....       | ....      | ....       | ....        | ....          | ....       | ....        | ....       |
| 01/04/89    | LT 1.340  | 0.371      | ....      | LT 0.050   | ....        | 2.300         | LT 0.051   | ....        | ....       |
| 01/11/89    | LT 1.340  | 0.435      | ....      | LT 0.050   | ....        | 2.200         | LT 0.051   | ....        | ....       |
| 01/18/89    | LT 1.340  | 0.405      | LT 0.550  | LT 0.050   | LT 1.370    | 2.163         | LT 0.051   | LT 1.470    | 87,500     |
| 01/25/89    | LT 1.340  | 0.487      | ....      | LT 0.050   | ....        | 2.270         | 0.063      | ....        | ....       |
| 02/01/89    | LT 1.340  | 0.496      | ....      | LT 0.050   | ....        | 2.240         | LT 0.051   | ....        | ....       |
| 02/08/89    | LT 1.340  | 0.495      | ....      | LT 0.050   | ....        | 1.980         | LT 0.051   | ....        | ....       |
| 02/15/89    | LT 1.340  | 0.516      | ....      | LT 0.050   | ....        | 2.240         | LT 0.051   | ....        | ....       |
| 02/22/89    | LT 1.340  | ....       | ....      | ....       | ....        | 2.070         | ....       | ....        | ....       |
| 03/01/89    | ....      | 0.388      | ....      | LT 0.050   | ....        | 2.050         | LT 0.051   | ....        | ....       |
| 03/08/89    | LT 1.340  | 0.367      | ....      | LT 0.050   | ....        | 2.220         | LT 0.051   | ....        | ....       |
| 03/15/89    | LT 1.340  | 0.412      | ....      | LT 0.050   | ....        | 2.070         | LT 0.051   | ....        | ....       |
| 03/22/89    | LT 1.340  | 0.417      | ....      | LT 0.050   | ....        | 1.910         | LT 0.051   | ....        | ....       |
| 03/29/89    | LT 1.340  | 0.364      | ....      | LT 0.050   | ....        | 1.920         | LT 0.051   | ....        | ....       |
| 04/05/89    | LT 1.340  | 0.375      | ....      | LT 0.050   | ....        | 1.920         | 0.072      | ....        | ....       |
| 04/12/89    | LT 1.340  | 0.469      | ....      | LT 0.050   | ....        | 1.800         | LT 0.051   | ....        | ....       |
| 04/19/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.830         | LT 0.051   | ....        | ....       |
| 04/26/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.860         | LT 0.051   | ....        | ....       |
| 05/03/89    | LT 1.340  | 0.431      | ....      | LT 0.050   | ....        | 1.710         | LT 0.051   | ....        | ....       |
| 05/10/89    | LT 1.340  | 0.431      | ....      | LT 0.050   | ....        | 1.975         | LT 0.051   | ....        | ....       |
| 05/17/89    | LT 1.340  | 0.418      | ....      | LT 0.050   | ....        | 1.750         | LT 0.051   | ....        | ....       |
| 05/24/89    | LT 1.340  | 0.390      | ....      | LT 0.050   | ....        | 1.760         | LT 0.051   | ....        | ....       |
| 05/31/89    | LT 1.340  | 0.419      | ....      | LT 0.050   | ....        | 1.550         | LT 0.051   | ....        | ....       |
| 06/07/89    | LT 1.340  | 0.370      | ....      | LT 0.050   | ....        | 1.360         | LT 0.051   | ....        | ....       |
| 06/14/89    | LT 1.340  | 0.403      | ....      | LT 0.050   | ....        | 1.410         | LT 0.051   | ....        | ....       |
| 06/21/89    | LT 1.340  | 0.451      | LT 0.405  | LT 0.050   | LT 1.370    | 2.017         | LT 0.051   | LT 1.470    | ....       |
| 06/28/89    | LT 1.340  | 0.372      | ....      | LT 0.050   | ....        | 2.250         | LT 0.051   | ....        | ....       |
| 07/05/89    | LT 1.340  | 0.439      | ....      | LT 0.050   | ....        | 2.700         | LT 0.051   | ....        | ....       |
| 07/12/89    | LT 1.340  | 0.514      | ....      | LT 0.050   | ....        | 2.480         | LT 0.051   | ....        | ....       |
| 07/19/89    | LT 1.340  | 0.537      | ....      | LT 0.050   | ....        | 2.220         | LT 0.051   | ....        | ....       |
| 07/26/89    | LT 1.340  | 0.467      | ....      | LT 0.050   | ....        | 2.080         | LT 0.051   | ....        | ....       |
| 08/02/89    | LT 1.340  | 0.422      | ....      | LT 0.050   | ....        | 2.110         | LT 0.051   | ....        | ....       |
| 08/09/89    | LT 1.340  | 0.424      | ....      | LT 0.050   | ....        | 2.140         | LT 0.051   | ....        | ....       |
| 08/16/89    | LT 1.340  | 0.505      | ....      | LT 0.050   | ....        | 2.110         | LT 0.051   | ....        | ....       |
| 08/23/89    | LT 1.340  | 0.466      | ....      | LT 0.050   | ....        | 2.060         | LT 0.051   | ....        | ....       |
| 08/30/89    | LT 1.340  | 0.458      | ....      | LT 0.050   | ....        | 2.070         | LT 0.051   | ....        | ....       |
| 09/06/89    | LT 1.340  | 0.444      | ....      | LT 0.050   | ....        | 2.000         | LT 0.051   | ....        | ....       |
| 09/13/89    | LT 1.340  | 0.238      | ....      | LT 0.050   | ....        | 1.980         | LT 0.051   | ....        | ....       |
| 09/20/89    | LT 1.340  | 0.422      | ....      | LT 0.050   | ....        | 2.050         | LT 0.051   | ....        | ....       |
| 09/27/89    | LT 1.340  | 0.469      | ....      | LT 0.050   | ....        | 2.300         | LT 0.051   | ....        | ....       |

LT = LESS THAN The Following Concentration  
 ug/l = MICROGRAM PER LITER

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED  
 mg/l = MILLIGRAM PER LITER

## NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 89

| SAMPLE DATE | OXAT ug/l | PPDDE ug/l | PPDDE ug/l | PRTHN ug/l | SO4 mg/l | SUPONA ug/l | TCLEE ug/l | TRCLE ug/l | XYLEN ug/l |
|-------------|-----------|------------|------------|------------|----------|-------------|------------|------------|------------|
| 10/06/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 10/13/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 10/20/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | ....       | ....       |
| 10/27/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 11/03/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 11/10/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 11/17/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 11/24/88    | ....      | ....       | ....       | ....       | ....     | ....        | ....       | ....       | ....       |
| 12/01/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 12/08/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 12/15/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 12/22/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 12/29/88    | ....      | ....       | ....       | ....       | ....     | ....        | ....       | ....       | ....       |
| 01/04/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 01/11/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 01/18/89    | LT 2.380  | LT 0.054   | LT 0.049   | LT 0.647   | 130      | LT 0.769    | ....       | LT 0.560   | LT 1.360   |
| 01/25/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 02/01/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 02/08/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 02/15/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 02/22/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/01/89    | ....      | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/08/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/15/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/22/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/29/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 04/05/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 04/12/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 04/19/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 04/26/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/03/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/10/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/17/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/24/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/31/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 06/07/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 06/14/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 06/21/89    | LT 2.380  | LT 0.054   | LT 0.049   | 1.765      | 140      | ....        | LT 0.750   | 0.668      | LT 1.360   |
| 06/28/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 07/05/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 07/12/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 07/19/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 07/26/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/02/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/09/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/16/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/23/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/30/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 09/06/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 09/13/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 09/20/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 09/27/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |

LT = LESS THAN The Following Concentration  
 ug/l = MICROGRAM PER LITER

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED  
 mg/l = MILLIGRAM PER LITER

## NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

| SAMPLE DATE | 111TCE ug/l | 112TCE ug/l | 11DCE ug/l | 11DCLE ug/l | 12DCE ug/l | 12DCLE ug/l | 13DMB ug/l | ALDRN ug/l | AS ug/l  |
|-------------|-------------|-------------|------------|-------------|------------|-------------|------------|------------|----------|
| 10/06/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 10/13/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 10/20/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 10/27/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 11/03/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 11/10/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 11/17/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 11/24/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 12/01/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 12/08/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 12/15/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | 0.116      | ....     |
| 12/22/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 12/29/88    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 01/04/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 01/11/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 01/18/89    | LT 0.760    | LT 0.780    | LT 1.700   | LT 0.730    | LT 0.760   | LT 1.100    | LT 1.320   | LT 0.050   | LT 2.350 |
| 01/25/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 02/01/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 02/08/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | 0.073      | ....     |
| 02/15/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 02/22/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 03/01/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 03/08/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 03/15/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 03/22/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 03/29/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 04/05/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 04/12/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 04/19/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | 0.081      | ....     |
| 04/26/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/03/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/10/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/17/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/24/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 05/31/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 06/07/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 06/14/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 06/21/89    | LT 0.760    | LT 0.780    | LT 1.700   | LT 0.730    | LT 0.760   | LT 1.100    | LT 1.320   | LT 0.050   | LT 2.350 |
| 06/28/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 07/05/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 07/12/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 07/19/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 07/26/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 08/02/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 08/09/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | ....       | ....     |
| 08/16/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 08/23/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 08/30/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 09/06/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 09/13/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 09/20/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |
| 09/27/89    | ....        | ....        | ....       | ....        | ....       | ....        | ....       | LT 0.050   | ....     |

LT = LESS THAN The Following Concentration  
 ug/l = MICROGRAM PER LITER

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED  
 mg/l = MILLIGRAM PER LITER

## NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

| SAMPLE DATE | ATZ ug/l | BCHPD ug/l | BTZ ug/l | C6H6 ug/l | CCL4 ug/l | CH2CL2 ug/l | CHCL3 ug/l | CHLORIDE mg/l | CL6CP ug/l |
|-------------|----------|------------|----------|-----------|-----------|-------------|------------|---------------|------------|
| 10/06/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 330           | ....       |
| 10/13/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 300           | ....       |
| 10/20/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 330           | ....       |
| 10/27/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 330           | ....       |
| 11/03/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 290           | ....       |
| 11/10/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 300           | ....       |
| 11/17/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 320           | ....       |
| 11/24/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | ....          | ....       |
| 12/01/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 300           | ....       |
| 12/08/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 310           | ....       |
| 12/15/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 12/22/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 12/29/88    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | ....          | ....       |
| 01/04/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 01/11/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 250           | ....       |
| 01/18/89    | LT 4.030 | ....       | LT 5.000 | LT 1.050  | LT 0.990  | LT 7.400    | 23.500     | 250           | LT 0.048   |
| 01/25/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 02/01/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 260           | ....       |
| 02/08/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 02/15/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 250           | ....       |
| 02/22/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 03/01/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 03/08/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 250           | ....       |
| 03/15/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 03/22/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 03/29/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 04/05/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 04/12/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 04/19/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 04/26/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 05/03/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 05/10/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 05/17/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 05/24/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 250           | ....       |
| 05/31/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 06/07/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 200           | ....       |
| 06/14/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 210           | ....       |
| 06/21/89    | ....     | LT 5.900   | LT 5.000 | LT 1.050  | LT 0.990  | LT 7.400    | 19.700     | 265           | LT 0.048   |
| 06/28/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 300           | ....       |
| 07/05/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 350           | ....       |
| 07/12/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 280           | ....       |
| 07/19/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 07/26/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 250           | ....       |
| 08/02/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 240           | ....       |
| 08/09/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 08/16/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 220           | ....       |
| 08/23/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 230           | ....       |
| 08/30/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 270           | ....       |
| 09/06/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 260           | ....       |
| 09/13/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 260           | ....       |
| 09/20/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 280           | ....       |
| 09/27/89    | ....     | ....       | ....     | ....      | ....      | ....        | ....       | 330           | ....       |

LT = LESS THAN The Following Concentration  
ug/l = MICROGRAM PER LITER

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED  
mg/l = MILLIGRAM PER LITER

## NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

| SAMPLE DATE | CLC6H5 ug/l | CLDAN ug/l | CPMS ug/l | CPMSO ug/l | CPMSO2 ug/l | DBCP ug/l | DCPD ug/l | DDVP ug/l | DIMP ug/l |
|-------------|-------------|------------|-----------|------------|-------------|-----------|-----------|-----------|-----------|
| 10/06/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | ....      | ....      | 4.310     |
| 10/13/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | ....      | ....      | 5.080     |
| 10/20/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | ....      | LT 5.000  | ....      | ....      |
| 10/27/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.410     |
| 11/03/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.990     |
| 11/10/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.180     |
| 11/17/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.590     |
| 11/24/88    | ....        | ....       | ....      | ....       | ....        | ....      | ....      | ....      | ....      |
| 12/01/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.490     |
| 12/08/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.390     |
| 12/15/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.610     |
| 12/22/88    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.490     |
| 12/29/88    | ....        | ....       | ....      | ....       | ....        | ....      | ....      | ....      | ....      |
| 01/04/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.240     |
| 01/11/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.590     |
| 01/18/89    | LT 0.820    | LT 0.095   | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | LT 0.384  | 3.770     |
| 01/25/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.510     |
| 02/01/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.820     |
| 02/08/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.470     |
| 02/15/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.740     |
| 02/22/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.760     |
| 03/01/89    | ....        | ....       | ....      | ....       | ....        | ....      | LT 5.000  | ....      | 3.350     |
| 03/08/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.650     |
| 03/15/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.360     |
| 03/22/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | ....      | ....      | 3.850     |
| 03/29/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.660     |
| 04/05/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.190     |
| 04/12/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.900     |
| 04/19/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.770     |
| 04/26/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.470     |
| 05/03/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.240     |
| 05/10/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.970     |
| 05/17/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.360     |
| 05/24/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.450     |
| 05/31/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.650     |
| 06/07/89    | ....        | ....       | ....      | ....       | ....        | LT 0.195  | LT 5.000  | ....      | 4.460     |
| 06/14/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.200     |
| 06/21/89    | LT 0.820    | LT 0.095   | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.710     |
| 06/28/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.740     |
| 07/05/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.090     |
| 07/12/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 5.390     |
| 07/19/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 830       |
| 07/26/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.310     |
| 08/02/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 2.550     |
| 08/09/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.950     |
| 08/16/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.840     |
| 08/23/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.890     |
| 08/30/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.360     |
| 09/06/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 4.150     |
| 09/13/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | 3.910     |
| 09/20/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | ....      | ....      | 3.160     |
| 09/27/89    | ....        | ....       | LT 5.690  | LT 11.500  | LT 7.460    | LT 0.195  | LT 5.000  | ....      | ....      |

LT = LESS THAN The Following Concentration

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER

mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

| SAMPLE DATE | DITH ug/l | DLDRN ug/l | DMDS ug/l | ENDRN ug/l | ETC6H5 ug/l | FLUORIDE mg/l | IODO ug/l | MEC6H5 ug/l | MLTHN ug/l |
|-------------|-----------|------------|-----------|------------|-------------|---------------|-----------|-------------|------------|
| 10/06/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.550         | LT 0.051  | ....        | ....       |
| 10/13/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | ....          | LT 0.051  | ....        | ....       |
| 10/20/88    | LT 1.340  | ....       | ....      | ....       | ....        | 2.300         | ....      | ....        | ....       |
| 10/27/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.600         | LT 0.051  | ....        | ....       |
| 11/03/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.480         | LT 0.051  | ....        | ....       |
| 11/10/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.530         | LT 0.051  | ....        | ....       |
| 11/17/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.650         | LT 0.051  | ....        | ....       |
| 11/24/88    | ....      | ....       | ....      | ....       | ....        | ....          | ....      | ....        | ....       |
| 12/01/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.680         | LT 0.051  | ....        | ....       |
| 12/08/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.720         | LT 0.051  | ....        | ....       |
| 12/15/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.480         | LT 0.051  | ....        | ....       |
| 12/22/88    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.310         | LT 0.051  | ....        | ....       |
| 12/29/88    | ....      | ....       | ....      | ....       | ....        | ....          | ....      | ....        | ....       |
| 01/04/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.320         | LT 0.051  | ....        | ....       |
| 01/11/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.380         | LT 0.051  | ....        | ....       |
| 01/18/89    | LT 1.340  | LT 0.050   | LT 0.550  | LT 0.050   | LT 1.370    | 2.185         | LT 0.051  | LT 1.470    | 90,000     |
| 01/25/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.210         | LT 0.051  | ....        | ....       |
| 02/01/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.260         | LT 0.051  | ....        | ....       |
| 02/08/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.050         | LT 0.051  | ....        | ....       |
| 02/15/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.200         | LT 0.051  | ....        | ....       |
| 02/22/89    | LT 1.340  | ....       | ....      | ....       | ....        | 2.090         | ....      | ....        | ....       |
| 03/01/89    | ....      | LT 0.050   | ....      | LT 0.050   | ....        | 2.090         | LT 0.051  | ....        | ....       |
| 03/08/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.190         | LT 0.051  | ....        | ....       |
| 03/15/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.970         | LT 0.051  | ....        | ....       |
| 03/22/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.930         | LT 0.051  | ....        | ....       |
| 03/29/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.910         | LT 0.051  | ....        | ....       |
| 04/05/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.910         | LT 0.051  | ....        | ....       |
| 04/12/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.840         | LT 0.051  | ....        | ....       |
| 04/19/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.790         | LT 0.051  | ....        | ....       |
| 04/26/89    | LT 1.340  | 0.192      | ....      | LT 0.050   | ....        | 1.910         | LT 0.051  | ....        | ....       |
| 05/03/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.700         | LT 0.051  | ....        | ....       |
| 05/10/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.030         | LT 0.051  | ....        | ....       |
| 05/17/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.730         | LT 0.051  | ....        | ....       |
| 05/24/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.680         | LT 0.051  | ....        | ....       |
| 05/31/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.570         | LT 0.051  | ....        | ....       |
| 06/07/89    | ....      | LT 0.050   | ....      | LT 0.050   | ....        | 1.390         | LT 0.051  | ....        | ....       |
| 06/14/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.430         | LT 0.051  | ....        | ....       |
| 06/21/89    | LT 1.340  | LT 0.050   | LT 0.429  | LT 0.050   | LT 1.370    | 2.055         | LT 0.051  | LT 1.470    | ....       |
| 06/28/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.250         | LT 0.051  | ....        | ....       |
| 07/05/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.630         | LT 0.051  | ....        | ....       |
| 07/12/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.420         | LT 0.051  | ....        | ....       |
| 07/19/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.140         | LT 0.051  | ....        | ....       |
| 07/26/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.100         | LT 0.051  | ....        | ....       |
| 08/02/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.190         | LT 0.051  | ....        | ....       |
| 08/09/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.110         | LT 0.051  | ....        | ....       |
| 08/16/89    | LT 1.340  | 0.096      | ....      | LT 0.050   | ....        | 2.140         | LT 0.051  | ....        | ....       |
| 08/23/89    | LT 1.340  | 0.055      | ....      | LT 0.050   | ....        | 2.040         | LT 0.051  | ....        | ....       |
| 08/30/89    | LT 1.340  | 0.062      | ....      | LT 0.050   | ....        | 2.030         | LT 0.051  | ....        | ....       |
| 09/06/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 1.700         | LT 0.051  | ....        | ....       |
| 09/13/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.150         | LT 0.051  | ....        | ....       |
| 09/20/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.030         | LT 0.051  | ....        | ....       |
| 09/27/89    | LT 1.340  | LT 0.050   | ....      | LT 0.050   | ....        | 2.370         | LT 0.051  | ....        | ....       |

LT = LESS THAN The Following Concentration

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER

mg/l = MILLIGRAM PER LITER

## NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

| SAMPLE DATE | OXAT ug/l | PPDDE ug/l | PPDDE ug/l | PRTHN ug/l | SO4 mg/l | SUPONA ug/l | TCLEE ug/l | TRCLE ug/l | XYLEN ug/l |
|-------------|-----------|------------|------------|------------|----------|-------------|------------|------------|------------|
| 10/06/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 10/13/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 10/20/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | ....       | ....       |
| 10/27/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 11/03/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 11/10/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 11/17/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 11/24/88    | ....      | ....       | ....       | ....       | ....     | ....        | ....       | ....       | ....       |
| 12/01/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 12/08/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 12/15/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 12/22/88    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 12/29/88    | ....      | ....       | ....       | ....       | ....     | ....        | ....       | ....       | ....       |
| 01/04/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 01/11/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 01/18/89    | LT 2.380  | LT 0.054   | LT 0.049   | LT 0.647   | 130      | LT 0.769    | ....       | LT 0.560   | LT 1.360   |
| 01/25/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 02/01/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 02/08/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 02/15/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 02/22/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/01/89    | ....      | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/08/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/15/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/22/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 03/29/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 04/05/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 04/12/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 04/19/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 04/26/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/03/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/10/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/17/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 05/24/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | ....       | ....       |
| 05/31/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 06/07/89    | ....      | ....       | ....       | ....       | ....     | ....        | ....       | ....       | ....       |
| 06/14/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 06/21/89    | LT 2.380  | LT 0.054   | LT 0.049   | 1.660      | 140      | ....        | 1.970      | LT 0.560   | LT 1.360   |
| 06/28/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 07/05/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 07/12/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 07/19/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 07/26/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/02/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/09/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/16/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/23/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 08/30/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 09/06/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 09/13/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 09/20/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |
| 09/27/89    | LT 2.380  | ....       | ....       | ....       | ....     | ....        | ....       | LT 0.560   | ....       |

LT = LESS THAN The Following Concentration  
 ug/l = MICROGRAM PER LITER

.... INDICATES THAT ANALYSIS WAS NOT PERFORMED  
 mg/l = MILLIGRAM PER LITER

D.P.A.

DATACHEM  
FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY SYSTEM

09/18/90

SITE: PWININ

| ANALYTE | TOT  | SAMP | % >  | MTH NO.    | CERTIFIED REPORT |     |        | MEAN   | LOW    | HIGH   |
|---------|------|------|------|------------|------------------|-----|--------|--------|--------|--------|
|         | SAMP | >CRL | CRL  |            | LIMIT (LT)       | UOM |        |        | VALUE  | VALUE  |
| 111TCE  | 2    | 0    | 0%   | N8         | 0.76             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| 112TCE  | 2    | 0    | 0%   | N8         | 0.78             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| 11DCE   | 2    | 0    | 0%   | N8         | 1.70             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| 11DCLE  | 2    | 0    | 0%   | N8         | 0.73             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| 12DCE   | 2    | 0    | 0%   | N8         | 0.76             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| 12DCLE  | 2    | 0    | 0%   | N8         | 1.10             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| 13DMB   | 2    | 0    | 0%   | AV8        | 1.32             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| ALDRN   | 47   | 2    | 4%   | KK8        | 0.05             | UGL | LT CRL | LT CRL | 0.11   |        |
| AS      | 2    | 0    | 0%   | AX8        | 2.35             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| ATZ     | 1    | 0    | 0%   | UH11       | 4.03             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| BCHPD   | 1    | 0    | 0%   | P8         | 5.90             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| BTZ     | 2    | 0    | 0%   | AAA8       | 5.00             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| C6H6    | 2    | 0    | 0%   | AV8        | 1.05             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| CCL4    | 2    | 0    | 0%   | N8         | 0.99             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| CH2CL2  | 2    | 0    | 0%   | N8         | 7.40             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| CHCL3   | 2    | 2    | 100% | N8         |                  | UGL |        | 34.73  | 21.65  | 47.80  |
| CL      | 49   | 49   | 100% | HH8A, TT09 |                  | MGL |        | 264.97 | 190.00 | 360.00 |
| CL6CP   | 2    | 0    | 0%   | KK8        | 0.05             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| CLC6H5  | 2    | 0    | 0%   | N8         | 0.82             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| CLDAN   | 2    | 0    | 0%   | KK8        | 0.10             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| CPMS    | 49   | 0    | 0%   | AAA8       | 5.69             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| CPMSO   | 49   | 0    | 0%   | AAA8       | 11.5             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| CPMSO2  | 49   | 0    | 0%   | AAA8       | 7.46             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| DBCP    | 48   | 0    | 0%   | AY8        | 0.20             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| DCPD    | 46   | 0    | 0%   | P8         | 5.00             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| DDVP    | 1    | 0    | 0%   | UH11       | 0.38             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| DIMP    | 47   | 47   | 100% | AW8A, AT8  |                  | UGL |        | 3.32   | 1.97   | 5.59   |
| DITH    | 49   | 0    | 0%   | AAA8       | 1.34             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| DLDRN   | 48   | 46   | 96%  | KK8        | 0.05             | UGL |        | 0.39   | LT CRL | 0.65   |
| DMDS    | 2    | 0    | 0%   | AAA8       | 0.55             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| DMMP    | 1    | 0    | 0%   | AT8        | 0.19             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| ENDRN   | 48   | 1    | 2%   | KK8        | 0.05             | UGL | LT CRL | LT CRL | 0.05   |        |
| ETC6H5  | 2    | 0    | 0%   | AV8        | 1.37             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| F       | 49   | 49   | 100% | HH8A, TT09 |                  | MGL |        | 2.13   | 1.36   | 2.83   |
| ISODR   | 48   | 5    | 10%  | KK8        | 0.05             | UGL | LT CRL | LT CRL | 0.09   |        |
| MEC6H5  | 2    | 0    | 0%   | AV8        | 1.47             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| MIBK    | 1    | 0    | 0%   | P8         | 4.90             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| MLTHN   | 1    | 0    | 0%   | UH11       | 0.37             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| OXAT    | 49   | 0    | 0%   | AAA8       | 2.38             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| PPDDE   | 2    | 0    | 0%   | KK8        | 0.05             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| PPDDT   | 2    | 0    | 0%   | KK8        | 0.05             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| PRTHN   | 2    | 1    | 50%  | UH11       | 0.65             | UGL | LT CRL | LT CRL | 1.76   |        |
| SO4     | 2    | 2    | 100% | HH8A       |                  | MGL |        | 135.00 | 130.00 | 140.00 |
| SUPONA  | 1    | 0    | 0%   | UH11       | 0.79             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| TCLEE   | 2    | 0    | 0%   | N8         | 0.75             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| TRCLE   | 49   | 1    | 2%   | N8         | 0.56             | UGL | LT CRL | LT CRL | 0.67   |        |
| XYLEN   | 2    | 0    | 0%   | AV8        | 1.36             | UGL | LT CRL | LT CRL | LT CRL | LT CRL |
| ZN      | 2    | 1    | 50%  | GG8, SS12  | 18.0             | UGL | LT CRL | LT CRL | 22.95  |        |

D.P.A.

## DATAChem

09/18/90

FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY SYSTEM

SITE: PWEFEF

| ANALYTE | TOT SAMP | SAMP >CRL | % > CRL | MTH NO.    | CERTIFIED REPORT |     |  | MEAN   | LOW VALUE | HIGH VALUE |
|---------|----------|-----------|---------|------------|------------------|-----|--|--------|-----------|------------|
|         |          |           |         |            | LIMIT (LT)       | UOM |  |        |           |            |
| 111TCE  | 2        | 0         | 0%      | N8         | 0.76             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| 112TCE  | 2        | 0         | 0%      | N8         | 0.78             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| 11DCE   | 2        | 0         | 0%      | N8         | 1.70             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| 11DCLE  | 2        | 0         | 0%      | N8         | 0.73             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| 12DCE   | 2        | 0         | 0%      | N8         | 0.76             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| 12DCLE  | 2        | 0         | 0%      | N8         | 1.10             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| 13DMB   | 2        | 0         | 0%      | AV8        | 1.32             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| ALDRN   | 47       | 3         | 6%      | KK8        | 0.05             | UGL |  | LT CRL | LT CRL    | 0.1        |
| AS      | 2        | 0         | 0%      | AX8        | 2.35             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| ATZ     | 1        | 0         | 0%      | UH11       | 4.03             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| BCHPD   | 1        | 0         | 0%      | P8         | 5.90             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| BTZ     | 2        | 0         | 0%      | AAA8       | 5.00             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| C6H6    | 2        | 0         | 0%      | AV8        | 1.05             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| CCL4    | 2        | 0         | 0%      | N8         | 0.99             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| CH2CL2  | 2        | 0         | 0%      | N8         | 7.40             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| CHCL3   | 2        | 2         | 100%    | N8         |                  | UGL |  |        | 21.60     | 19.70      |
| CL      | 49       | 49        | 100%    | HH8A, TT09 |                  | MGL |  | 261.53 | 200.00    | 350.00     |
| CL6CP   | 2        | 0         | 0%      | KK8        | 0.05             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| CLC6H5  | 2        | 0         | 0%      | N8         | 0.82             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| CLDAN   | 2        | 0         | 0%      | KK8        | 0.10             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| CPMS    | 48       | 0         | 0%      | AAA8       | 5.69             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| CPMSO   | 48       | 0         | 0%      | AAA8       | 11.5             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| CPMSO2  | 48       | 0         | 0%      | AAA8       | 7.46             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| DBCP    | 48       | 0         | 0%      | AY8        | 0.20             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| DCPD    | 46       | 0         | 0%      | P8         | 5.00             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| DDVP    | 1        | 0         | 0%      | UH11       | 0.38             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| DIMP    | 47       | 47        | 100%    | AW8A, AT8  |                  | UGL |  |        | 4.17      | 2.19       |
| DITH    | 48       | 0         | 0%      | AAA8       | 1.34             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| DLDRN   | 48       | 4         | 8%      | KK8        | 0.05             | UGL |  | LT CRL | LT CRL    | 0.1        |
| DMDS    | 2        | 0         | 0%      | AAA8       | 0.55             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| DMMP    | 1        | 0         | 0%      | AT8        | 0.19             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| ENDRN   | 48       | 0         | 0%      | KK8        | 0.05             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| ETC6H5  | 2        | 0         | 0%      | AV8        | 1.37             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| F       | 49       | 49        | 100%    | HH8A, TT09 |                  | MGL |  |        | 2.13      | 1.39       |
| ISODR   | 48       | 0         | 0%      | KK8        | 0.05             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| MEC6H5  | 2        | 0         | 0%      | AV8        | 1.47             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| MIBK    | 1        | 0         | 0%      | P8         | 4.90             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| MLTHN   | 1        | 0         | 0%      | UH11       | 0.37             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| OXAT    | 48       | 0         | 0%      | AAA8       | 2.38             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| PPDDE   | 2        | 0         | 0%      | KK8        | 0.05             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| PPDDT   | 2        | 0         | 0%      | KK8        | 0.05             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| PRTHN   | 2        | 1         | 50%     | UH11       | 0.65             | UGL |  | LT CRL | LT CRL    | 1.66       |
| SO4     | 2        | 2         | 100%    | HH8A       |                  | MGL |  |        | 135.00    | 130.00     |
| SUPONA  | 1        | 0         | 0%      | UH11       | 0.79             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| TCLEE   | 2        | 1         | 50%     | N8         | 0.75             | UGL |  | LT CRL | LT CRL    | 1.97       |
| TRCLE   | 47       | 0         | 0%      | N8         | 0.56             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| XYLEN   | 2        | 0         | 0%      | AV8        | 1.36             | UGL |  | LT CRL | LT CRL    | LT CRL     |
| ZN      | 2        | 0         | 0%      | GG8, SS12  | 22.0, 18.0       | UGL |  | LT CRL | LT CRL    | LT CRL     |

D.P.A.

03/09/90

DATACHEM  
FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY SYSTEM

SITE: PWININ

| ANALYTE | CERTIFIED |           |         |            |            |     | MEAN       | LOW VALUE | HIGH VALUE |        |
|---------|-----------|-----------|---------|------------|------------|-----|------------|-----------|------------|--------|
|         | REPORT    |           | MTH NO. | LIMIT (LT) | UOM        |     |            |           |            |        |
|         | TOT SAMP  | SAMP >CRL |         |            |            | CRL |            |           |            |        |
| MLTHN   | 2         | 0         | 0%      | UH11       | 0.37       | UGL |            | LT CRL    | LT CRL     | LT CRL |
| NA      | 4         | 4         | 100%    | GG8, SS12  |            | UGL | 182,500.00 | 999.00    | 190,000    |        |
| NIT     | 2         | 2         | 100%    | LL8        |            | UGL | 6,650.00   | 999.00    | 6,900      |        |
| OXAT    | 54        | 0         | 0%      | AAA8       | 2.38       | UGL |            | LT CRL    | LT CRL     | LT CRL |
| PB      | 6         | 0         | 0%      | GG8, SS12  | 74.0, 43.4 | UGL |            | LT CRL    | LT CRL     | LT CRL |
| PPDDE   | 4         | 0         | 0%      | KK8        | 0.05       | UGL |            | LT CRL    | LT CRL     | LT CRL |
| PPDDT   | 4         | 0         | 0%      | KK8        | 0.05       | UGL |            | LT CRL    | LT CRL     | LT CRL |
| PRTHN   | 4         | 2         | 50%     | UH11       | 0.65       | UGL |            | LT CRL    | LT CRL     | 1.77   |
| SO4     | 4         | 4         | 100%    | HH8A       |            | MGL | 135.00     | 130.00    | 150.00     |        |
| SUPONA  | 2         | 0         | 0%      | UH11       | 0.79       | UGL |            | LT CRL    | LT CRL     | LT CRL |
| TCLEE   | 4         | 0         | 0%      | N8         | 0.75       | UGL |            | LT CRL    | LT CRL     | LT CRL |
| TRCLE   | 54        | 1         | 2%      | N8         | 0.56       | UGL |            | LT CRL    | LT CRL     | 0.88   |
| XYLEN   | 4         | 0         | 0%      | AV8        | 1.36       | UGL |            | LT CRL    | LT CRL     | LT CRL |
| ZN      | 4         | 1         | 25%     | GG8, SS12  | 22.0, 18.0 | UGL |            | LT CRL    | LT CRL     | 23.90  |

D.P.A.

03/09/90

**DATACHEM**  
**FY 89 STATISTICAL SUMMARY**  
**NORTHWEST BOUNDARY SYSTEM**

SITE: PWEFEF

| ANALYTE | TOT<br>SAMP | >CRL | CRL  | MTH NO.   | CERTIFIED            |     |            | LOW<br>VALUE | HIGH<br>VALUE |
|---------|-------------|------|------|-----------|----------------------|-----|------------|--------------|---------------|
|         |             |      |      |           | REPORT<br>LIMIT (LT) | UOM | MEAN       |              |               |
| MLTHN   | 1           | 0    | 0%   | UH11      | 0.37                 | UGL |            | LT CRL       | LT CRL        |
| NA      | 2           | 2    | 100% | GG8, SS12 |                      | UGL | 185,000.00 | 999.00       | 190,000       |
| NIT     | 1           | 1    | 100% | LL8       |                      | UGL | 6,500.00   | 999.00       | 6,500         |
| OXAT    | 50          | 0    | 0%   | AAA8      | 2.38                 | UGL |            | LT CRL       | LT CRL        |
| PB      | 3           | 0    | 0%   | GG8, SS12 | 74.0, 43.4           | UGL |            | LT CRL       | LT CRL        |
| PPDDE   | 2           | 0    | 0%   | KK8       | 0.05                 | UGL |            | LT CRL       | LT CRL        |
| PPDDT   | 2           | 0    | 0%   | KK8       | 0.05                 | UGL |            | LT CRL       | LT CRL        |
| PRTHN   | 2           | 1    | 50%  | UH11      | 0.65                 | UGL |            | LT CRL       | LT CRL        |
| SO4     | 2           | 2    | 100% | HH8A      |                      | MGL | 135.00     | 130.00       | 140.0         |
| SUPONA  | 1           | 0    | 0%   | UH11      | 0.79                 | UGL |            | LT CRL       | LT CRL        |
| TCLEE   | 2           | 1    | 50%  | N8        | 0.75                 | UGL |            | LT CRL       | LT CRL        |
| TRCLE   | 49          | 0    | 0%   | N8        | 0.56                 | UGL |            | LT CRL       | LT CRL        |
| XYLEN   | 2           | 0    | 0%   | AV8       | 1.36                 | UGL |            | LT CRL       | LT CRL        |
| ZN      | 2           | 0    | 0%   | GG8, SS12 | 22.0, 18.0           | UGL |            | LT CRL       | LT CRL        |

ROCKY MOUNTAIN ARSENAL  
NORTHWEST BOUNDARY CONTAINMENT\TREATMENT SYSTEM  
GC/MS ANALYTICAL DATA

LABORATORY: DATAChem

SAMPLE DATE: 06/21/89

UNIT OF MEASURE: UGL

| ANALYTE   | CODE   | PWININ    | PWEFEF    |
|---|--------|-----------|-----------|
| 2,3,6-TRICHLOROPHENOL                           | 236TCP | LT 1.70   | LT 1.70   |
| 2,4,5-TRICHLOROPHENOL                           | 245TCP | LT 2.80   | LT 2.80   |
| 2,4,6-TRICHLOROPHENOL                           | 246TCP | LT 3.60   | LT 3.60   |
| 2,4-DICHLOROPHENOL                              | 24DCLP | LT 8.40   | LT 8.40   |
| 2,4-DIMETHYLPHENOL                              | 24DMPN | LT 4.40   | LT 4.40   |
| 2,4-DINITROPHENOL                               | 24DNP  | LT 176.00 | LT 176.00 |
| 2-CHLOROPHENOL                                  | 2CLP   | LT 2.80   | LT 2.80   |
| 2-METHYLPHENOL                                  | 2MP    | LT 3.60   | LT 3.60   |
| 2-NITROPHENOL                                   | 2NP    | LT 8.20   | LT 8.20   |
| 3-METHYL-4-CHLOROPHENOL                         | 4CL3C  | LT 8.50   | LT 8.50   |
| 4-METHYLPHENOL                                  | 4MP    | LT 2.80   | LT 2.80   |
| 4-NITROPHENOL                                   | 4NP    | LT 96.00  | LT 96.00  |
| ALDRIN  | ALDRN  | LT 13.00  | LT 13.00  |
| ATRAZINE  | ATZ    | LT 5.90   | LT 5.90   |
| HEXACHLOROCYCLOPENTADIENE (HCCPD)               | CL6CP  | LT 54.00  | LT 54.00  |
| CHLORDANE                                       | CLDAN  | LT 37.00  | LT 37.00  |
| P-CHLOROPHENYLMETHYL SULFIDE                    | CPMS   | LT 10.00  | LT 10.00  |
| P-CHLOROPHENYLMETHYL SULFOXIDE                  | CPMSO  | LT 15.00  | LT 15.00  |
| P-CHLOROPHENYLMETHYL SULFONE                    | CPMSO2 | LT 5.30   | LT 5.30   |
| DIBROMOCHLOROPROPANE                            | DBCP   | LT 12.00  | LT 12.00  |
| DICYCLOPENTADIENE                               | DCPD   | LT 5.50   | LT 5.50   |
| VAPONA  | DDVP   | LT 8.50   | LT 8.50   |
| DIISOPROPYL METHYLPHOSPHONATE                   | DIMP   | LT 21.00  | LT 21.00  |
| DITHIANE  | DITH   | LT 3.30   | LT 3.30   |
| DIELDRIN  | DLDRN  | LT 26.00  | LT 26.00  |
| DIMETHYLMETHYLPHOSPHATE                         | DMMP   | LT 130.00 | LT 130.00 |
| ENDRIN  | ENDRN  | LT 18.00  | LT 18.00  |
| ISODRIN   | ISOOR  | LT 7.80   | LT 7.80   |
| MALATHION                                       | MLTHN  | LT 21.00  | LT 21.00  |
| 1,4-OXATHIANE                                   | OXAT   | LT 27.00  | LT 27.00  |
| PENTACHLOROPHENOL                               | PCP    | LT 9.10   | LT 9.10   |
| PHENOL  | PHENOL | LT 2.20   | LT 2.20   |
| 2,2-BIS(PARA-CHLOROPHENYL)-1,1-DICHLOROETHENE   | PPDDE  | LT 14.00  | LT 14.00  |
| 2,2-BIS(PARA-CHLOROPHENYL)1,1,1-TRICHLOROETHANE | PPDDT  | LT 18.00  | LT 18.00  |
| PARATHION                                       | PRTHN  | LT 37.00  | LT 37.00  |
| SUPONA  | SUPONA | LT 19.00  | LT 19.00  |

APPENDIX C  
DEWATERING WELL DATA

D.P.A.

DATAChem

FY 89 STATISTICAL SUMMARY

NORTHWEST BOUNDARY DEWATERING WELLS

03/20/90

ANALYTE: ALDRN

CERTIFIED REPORTING LIMIT (LT): 0.05

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.45          |
| 3           | 3           | 2            | 67%        | KK8     | UGL | LT CRL | LT CRL       | 0.08          |
| 4           | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.06          |
| 5           | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.08          |
| 6           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 4           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 9           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 4           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 11          | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.06          |
| 12          | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.09          |
| 13          | 4           | 1            | 25%        | KK8     | UGL | LT CRL | LT CRL       | 0.08          |
| 14          | 4           | 2            | 50%        | KK8     | UGL | LT CRL | LT CRL       | 0.23          |
| 15          | 4           | 1            | 25%        | KK8     | UGL | LT CRL | LT CRL       | 0.12          |

D.P.A.

DATACHEM  
FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: CHLORIDE

CERTIFIED REPORTING LIMIT (LT): 0.72, 0.278

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO.    | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|------------|-----|--------|--------------|---------------|
| 1           | 3           | 3            | 100%       | HH8A       | MGL | 166.67 | 160.00       | 170.00        |
| 2           | 3           | 3            | 100%       | HH8A       | MGL | 183.33 | 180.00       | 190.00        |
| 3           | 3           | 3            | 100%       | HH8A       | MGL | 263.33 | 210.00       | 330.00        |
| 4           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 230.00 | 190.00       | 260.00        |
| 5           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 243.33 | 210.00       | 300.00        |
| 6           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 280.00 | 250.00       | 300.00        |
| 7           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 286.67 | 270.00       | 310.00        |
| 8           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 306.67 | 290.00       | 340.00        |
| 9           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 263.33 | 230.00       | 290.00        |
| 10          | 3           | 3            | 100%       | HH8A, TT09 | MGL | 276.67 | 250.00       | 300.00        |
| 11          | 4           | 4            | 100%       | HH8A, TT09 | MGL | 367.50 | 300.00       | 440.00        |
| 12          | 4           | 4            | 100%       | HH8A, TT09 | MGL | 322.50 | 280.00       | 390.00        |
| 13          | 4           | 4            | 100%       | HH8A, TT09 | MGL | 417.50 | 290.00       | 680.00        |
| 14          | 5           | 5            | 100%       | HH8A, TT09 | MGL | 566.00 | 430.00       | 780.00        |
| 15          | 3           | 3            | 100%       | HH8A       | MGL | 586.67 | 520.00       | 690.00        |

D.P.A.

DATACHEM  
FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: COMB. ORGANO-SULFUR  
CERTIFIED REPORTING LIMIT (LT): 24.65

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 3           | 1           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 4           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 5           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 6           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 9           | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 11          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 12          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 13          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 14          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 15          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |

D.P.A.

**DATACHEM**  
**FY 89 STATISTICAL SUMMARY**  
**NORTHWEST BOUNDARY DEWATERING W**

03/20/90

**ANALYTE: DBCP**

CERTIFIED REPORTING LIMIT (LT): 0.195

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH<br>NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|------------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 3           | 2           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 4           | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 5           | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 6           | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 4           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 4           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 9           | 4           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 11          | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 12          | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 13          | 4           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 14          | 3           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |
| 15          | 4           | 0            | 0%         | AY8        | UGL | LT CRL | LT CRL       | LT CRL        |

D.P.A.

DATACHEM

FY 89 STATISTICAL SUMMARY

03/20/90

NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: DCPD

CERTIFIED REPORTING LIMIT (LT): 5

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 1            | 33%        | P8      | UGL | LT CRL | LT CRL       | 9.82          |
| 3           | 3           | 2            | 67%        | P8      | UGL | LT CRL | LT CRL       | 14.60         |
| 4           | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 5           | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 6           | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 9           | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 11          | 4           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 12          | 4           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 13          | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 14          | 4           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 15          | 3           | 0            | 0%         | P8      | UGL | LT CRL | LT CRL       | LT CRL        |

D.P.A.

03/20/90

DATACHEM  
FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: DIMP

CERTIFIED REPORTING LIMIT (LT): 0.65

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 1            | 33%        | AW8A    | UGL | LT CRL | LT CRL       | 1.35          |
| 2           | 3           | 1            | 33%        | AW8A    | UGL | LT CRL | LT CRL       | 1.70          |
| 3           | 3           | 3            | 100%       | AW8A    | UGL | 19.98  | 1.35         | 57.20         |
| 4           | 3           | 3            | 100%       | AW8A    | UGL | 1.73   | 1.35         | 2.34          |
| 5           | 3           | 3            | 100%       | AW8A    | UGL | 2.00   | 1.23         | 3.04          |
| 6           | 3           | 3            | 100%       | AW8A    | UGL | 3.93   | 3.53         | 4.26          |
| 7           | 4           | 4            | 100%       | AW8A    | UGL | 3.81   | 3.36         | 4.39          |
| 8           | 4           | 4            | 100%       | AW8A    | UGL | 4.89   | 4.47         | 5.34          |
| 9           | 4           | 4            | 100%       | AW8A    | UGL | 4.57   | 4.20         | 5.11          |
| 10          | 4           | 4            | 100%       | AW8A    | UGL | 4.54   | 4.01         | 4.96          |
| 11          | 3           | 3            | 100%       | AW8A    | UGL | 6.83   | 5.19         | 8.07          |
| 12          | 3           | 3            | 100%       | AW8A    | UGL | 4.55   | 3.65         | 5.43          |
| 13          | 4           | 4            | 100%       | AW8A    | UGL | 9.62   | 4.58         | 15.10         |
| 14          | 3           | 3            | 100%       | AW8A    | UGL | 9.91   | 7.96         | 12.60         |
| 15          | 4           | 4            | 100%       | AW8A    | UGL | 178.82 | 3.85         | 690.00        |

D.P.A.

## DATACHEM

FY 89 STATISTICAL SUMMARY

03/20/90

NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: DITH

CERTIFIED REPORTING LIMIT (LT): 1.34

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 3           | 1           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 4           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 5           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 6           | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 9           | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 3           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 11          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 12          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 13          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 14          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |
| 15          | 4           | 0            | 0%         | AAA8    | UGL | LT CRL | LT CRL       | LT CRL        |

D.P.A.

DATACHEM  
FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY DEWATERING WELLS

03/20/90

ANALYTE: DLLRN  
CERTIFIED REPORTING LIMIT (LT): 0.05

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 3            | 100%       | KK8     | UGL | 0.44   | 0.24         | 0.68          |
| 2           | 3           | 3            | 100%       | KK8     | UGL | 0.65   | 0.41         | 1.10          |
| 3           | 3           | 3            | 100%       | KK8     | UGL | 1.00   | 0.81         | 1.10          |
| 4           | 3           | 3            | 100%       | KK8     | UGL | 0.65   | 0.60         | 0.73          |
| 5           | 3           | 3            | 100%       | KK8     | UGL | 0.59   | 0.52         | 0.65          |
| 6           | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.24          |
| 7           | 4           | 4            | 100%       | KK8     | UGL | 0.43   | 0.16         | 0.56          |
| 8           | 3           | 3            | 100%       | KK8     | UGL | 0.27   | 0.23         | 0.31          |
| 9           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 4           | 4            | 100%       | KK8     | UGL | 0.18   | 0.05         | 0.49          |
| 11          | 3           | 3            | 100%       | KK8     | UGL | 0.52   | 0.35         | 0.63          |
| 12          | 3           | 3            | 100%       | KK8     | UGL | 0.29   | 0.24         | 0.33          |
| 13          | 4           | 4            | 100%       | KK8     | UGL | 2.22   | 0.47         | 7.00          |
| 14          | 4           | 4            | 100%       | KK8     | UGL | 0.68   | 0.64         | 0.76          |
| 15          | 4           | 4            | 100%       | KK8     | UGL | 1.56   | 0.51         | 4.40          |

D.P.A.

## DATAChem

## FY 89 STATISTICAL SUMMARY

## NORTHWEST BOUNDARY DEWATERING WELLS

03/20/90

ANALYTE: ENDRN

CERTIFIED REPORTING LIMIT (LT): 0.05

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.47          |
| 3           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 4           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 5           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 6           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 4           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 9           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 4           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 11          | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 12          | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 13          | 4           | 1            | 25%        | KK8     | UGL | LT CRL | LT CRL       | 0.07          |
| 14          | 4           | 4            | 100%       | KK8     | UGL | 0.12   | 0.08         | 0.19          |
| 15          | 4           | 3            | 75%        | KK8     | UGL | 0.19   | 0.07         | 0.09          |

D.P.A.

03/20/90

DATACHEM  
FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: FLUORIDE  
CERTIFIED REPORTING LIMIT (LT): 0.482, 0.153

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO.    | UOM | MEAN | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|------------|-----|------|--------------|---------------|
| 1           | 3           | 3            | 100%       | HH8A       | MGL | 1.42 | 1.39         | 1.46          |
| 2           | 3           | 3            | 100%       | HH8A       | MGL | 1.60 | 1.54         | 1.71          |
| 3           | 3           | 3            | 100%       | HH8A       | MGL | 1.78 | 1.55         | 1.95          |
| 4           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 1.76 | 1.48         | 2.01          |
| 5           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 1.83 | 1.65         | 2.11          |
| 6           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 2.24 | 2.03         | 2.45          |
| 7           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 2.18 | 1.99         | 2.48          |
| 8           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 3.10 | 2.00         | 4.86          |
| 9           | 3           | 3            | 100%       | HH8A, TT09 | MGL | 1.82 | 1.45         | 2.30          |
| 10          | 3           | 3            | 100%       | HH8A, TT09 | MGL | 2.05 | 1.72         | 2.26          |
| 11          | 4           | 4            | 100%       | HH8A, TT09 | MGL | 2.42 | 1.80         | 3.13          |
| 12          | 4           | 4            | 100%       | HH8A, TT09 | MGL | 2.47 | 1.89         | 2.81          |
| 13          | 4           | 4            | 100%       | HH8A, TT09 | MGL | 3.13 | 1.97         | 4.64          |
| 14          | 5           | 5            | 100%       | HH8A, TT09 | MGL | 3.58 | 3.00         | 4.30          |
| 15          | 3           | 3            | 100%       | HH8A       | MGL | 3.99 | 3.59         | 4.77          |

D.P.A.

DATAChem

03/20/90

FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: ISODR

CERTIFIED REPORTING LIMIT (LT): 0.051

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 3           | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.08          |
| 4           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 5           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 6           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 4           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.07          |
| 9           | 3           | 0            | 0%         | KK8     | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 4           | 1            | 25%        | KK8     | UGL | LT CRL | LT CRL       | 0.62          |
| 11          | 3           | 2            | 67%        | KK8     | UGL | LT CRL | LT CRL       | 0.18          |
| 12          | 3           | 1            | 33%        | KK8     | UGL | LT CRL | LT CRL       | 0.09          |
| 13          | 4           | 1            | 25%        | KK8     | UGL | LT CRL | LT CRL       | 0.07          |
| 14          | 4           | 2            | 50%        | KK8     | UGL | LT CRL | LT CRL       | 0.28          |
| 15          | 4           | 2            | 50%        | KK8     | UGL | LT CRL | LT CRL       | 0.35          |

D.P.A.

DATACHEM  
FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY DEWATERING WELLS

03/20/90

ANALYTE: OXAT  
CERTIFIED REPORTING LIMIT (LT): 2.38

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH<br>NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|------------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 3           | 1           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 4           | 3           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 5           | 3           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 6           | 3           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 4           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 4           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 9           | 4           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 3           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 11          | 4           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 12          | 4           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 13          | 4           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 14          | 4           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |
| 15          | 4           | 0            | 0%         | AAA8       | UGL | LT CRL | LT CRL       | LT CRL        |

D.P.A.

## DATAChem

03/20/90

FY 89 STATISTICAL SUMMARY  
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: TRCLE

CERTIFIED REPORTING LIMIT (LT): 0.56

| WELL<br>NO. | TOT<br>SAMP | SAMP<br>>CRL | % ><br>CRL | MTH NO. | UOM | MEAN   | LOW<br>VALUE | HIGH<br>VALUE |
|-------------|-------------|--------------|------------|---------|-----|--------|--------------|---------------|
| 1           | 3           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 2           | 3           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 3           | 3           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 4           | 3           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 5           | 3           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 6           | 3           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 7           | 4           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 8           | 4           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 9           | 4           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 10          | 4           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 11          | 3           | 1            | 33%        | N8      | UGL | LT CRL | LT CRL       | 0.67          |
| 12          | 3           | 0            | 0%         | N8      | UGL | LT CRL | LT CRL       | LT CRL        |
| 13          | 4           | 1            | 25%        | N8      | UGL | LT CRL | LT CRL       | 1.27          |
| 14          | 4           | 4            | 100%       | N8      | UGL | 1.09   | 0.74         | 1.44          |
| 15          | 4           | 1            | 25%        | N8      | UGL | LT CRL | LT CRL       | 1.30          |

**APPENDIX D**  
**NORTHWEST BOUNDARY SYSTEM DOWNTIME**

NORTHWEST BOUNDARY

1st QUARTER FISCAL YEAR 90

QUARTERLY DOWNTIME SUMMARY

| DATE      | ADS/TIME LOSS | JUSTIFICATION                          |
|-----------|---------------|--|
| 12 OCT 88 | ALL/.25 hrs   | Plant power off - check transformer    |
| 21 OCT 88 | ALL/5.25 hrs  | Water leaks - main line and filter pod |

NO LOSS OF PLANT OPERATIONS DUE TO DOWNTIME WAS REPORTED FOR THE MONTH OF NOVEMBER 1988.

|           |            |                            |
|-----------|------------|----------------------------|
| 01 DEC 88 | V102/18.75 | Install R.C. Line Cleanout |
| 02 DEC 88 | V102/7.00  | Install R.C. Line Cleanout |

**1st QUARTER REPORT**

**FISCAL YEAR 19989**

**NORTHWEST BOUNDARY PLANT  
DOWNTIME SUMMARY BY ADSORBER**

| ADSORBER                   | TIME LOSS (HRS) |        |        | 1st QTR<br>FY 1989 |
|----------------------------|-----------------|--------|--------|--------------------|
|                            | OCT 88          | NOV 88 | DEC 88 |                    |
| V101                       | 0.00            | 0.00   | 0.00   | 0.00               |
| V102                       | 0.00            | 0.00   | 25.75  | 25.75              |
| V103                       | 0.00            | 0.00   | 0.00   | 0.00               |
| ALL (the the<br>same time) | 5.50            | 0.00   | 0.00   | 5.50               |

NORTHWEST BOUNDARY SYSTEM  
2nd QUARTER REPORT  
FISCAL YEAR 1989

AVERAGE FLOWS:

| Area<br>of<br>Consideration        | Time<br>of<br>Period | 1 Jan -<br>1 Feb 89          | 1 Feb -<br>30 Nov 89         | 1 Mar -<br>31 Dec 89         | 1 Jan -<br>1 Apr 89          |
|------------------------------------|----------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Recharge - Flow<br>Wells<br>(RC)   | - Total              | 545.04 gpm<br>24,330,500 gal | 558.37 gpm<br>22,513,400 gal | 591.36 gpm<br>26,398,200 gal | 564.81 gpm<br>73,242,100 gal |
| Dewatering - Flow<br>Wells<br>(DW) | - Total              | 482.44 gpm<br>21,535,900 gal | 527.68 gpm<br>21,276,000 gal | 504.23 gpm<br>22,508,900 gal | 504.78 gpm<br>65,320,800 gal |
| Plant - Flow<br>(All Ads)          | - Total              | 585.49 gpm<br>26,136,000 gal | 618.62 gpm<br>24,943,000 gal | 650.45 gpm<br>29,036,000 gal | 285.23 gpm<br>80,115,000 gal |
| Ads 101 - Flow                     | - Total              | 0.00 gpm<br>0 gal            | 199.08 gpm<br>8,027,000 gal  | 361.16 gpm<br>16,122,000 gal | 186.75 gpm<br>24,149,000 gpm |
| Ads 102 - Flow                     | - Total              | 351.12 gpm<br>15,674,000 gal | 141.65 gpm<br>5,711,000 gal  | 0.00 gpm<br>0 gal            | 164.26 gpm<br>21,385,000 gal |
| Ads 103 - Flow                     | - Total              | 234.37 gpm<br>10,462,000 gal | 277.89 gpm<br>11,205,000 gal | 289.29 gpm<br>12,914,000 gal | 267.18 gpm<br>34,581,000 gal |

NORTHWEST BOUNDARY SYSTEM  
PLANT DOWNTIME SUMMARY  
2nd QUARTER 1989

PLANT SUMMARY

PERIOD: 1 Jan - 1 Apr 89

| DATE      | ADS/LOSS  | TIME | JUSTIFICATION  |
|-----------|-----------|------|----------------|
| 10 Feb 89 | 102/4.17  | hrs. | Plugged Line   |
| 10 Feb 89 | 103/4.42  | hrs. | Plugged Line   |
| 14 Feb 89 | 102/11.00 | hrs. | Plugged Line   |
| 14 Feb 89 | 103/5.67  | hrs. | Plugged Line   |
| 15 Feb 89 | 101/13.42 | hrs. | Restart/Opns.  |
| 15 Feb 89 | 102/5.58  | hrs. | Stop/Opns.     |
| 15 Feb 89 | 103/13.42 | hrs. | Plugged Filter |

NORTHWEST BOUNDARY SYSTEM  
PLANT DOWNTIME SUMMARY  
3rd QUARTER 1989

PERIOD 1 Apr - 1 Jul 89

NOTE: There was no downtime for the entire 3rd quarter in Fiscal Year 1989.

**NORTHWEST BOUNDARY SYSTEM**  
**3rd QUARTER REPORT**  
**FISCAL YEAR 1989**

**AVERAGE FLOWS:**

| Area<br>of<br>Consideration        | Time<br>Period | 1 Apr -<br>1 May 89          | 1 May -<br>30 Jun 89         | 1 Jun -<br>31 Jul 89         | 1 Apr -<br>1 Jul 89          |
|------------------------------------|----------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Recharge - Flow<br>Wells<br>(RC)   | - Total        | 618.11 gpm<br>26,702,100 gal | 605.49 gpm<br>27,029,200 gal | 593.94 gpm<br>25,658,000 gal | 605.85 gpm<br>79,389,300 gal |
| Dewatering - Flow<br>Wells<br>(DW) | - Total        | 675.25 gpm<br>29,170,600 gal | 598.05 gpm<br>26,969,900 gal | 589.49 gpm<br>25,466,100 gal | 620.93 gpm<br>81,333,600 gal |
| Plant - Flow<br>(All Ads)          | - Total        | 684.96 gpm<br>29,590,000 gal | 667.04 gpm<br>29,777,000 gal | 658.27 gpm<br>28,437,000 gal | 670.09 gpm<br>87,804,000 gal |
| Ads 101 - Flow                     | - Total        | 336.80 gpm<br>14,550,000 gal | 339.14 gpm<br>15,139,000 gal | 658.27 gpm<br>14,455,000 gal | 670.09 gpm<br>44,144,000 gpm |
| Ads 102 - Flow                     | - Total        | 0.00 gpm<br>0 gal            | 0.00 gpm<br>0 gal            | 0.00 gpm<br>0 gal            | 0.00 gpm<br>0 gal            |
| Ads 103 - Flow                     | - Total        | 348.15 gpm<br>15,040,000 gal | 327.90 gpm<br>14,638,000 gal | 323.66 gpm<br>13,982,000 gal | 333.24 gpm<br>43,660,000 gal |

NORTHWEST BOUNDARY SYSTEM  
4th QUARTER REPORT  
FISCAL YEAR 1989

AVERAGE FLOWS:

| Area<br>of<br>Consideration     | Time<br>of<br>Period | 1 Jul -<br>1 Aug 89          | 1 Aug -<br>30 Sep 89         | 1 Sep -<br>31 Oct 89         | 1 Jul -<br>1 Oct 89          |
|---------------------------------|----------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Recharge - Flow Wells<br>(RC)   | - Total              | 562.83 gpm<br>25,124,800 gal | 523.07 gpm<br>23,349,700 gal | 530.19 gpm<br>22,903,800 gal | 538.69 gpm<br>71,378,300 gal |
| Dewatering - Flow Wells<br>(DW) | - Total              | 588.85 gpm<br>29,947,100 gal | 528.45 gpm<br>23,589,800 gal | 551.29 gpm<br>23,815,600 gal | 556.20 gpm<br>72,352,500 gal |
| Plant - Flow<br>(All Ads)       | - Total              | 622.19 gpm<br>27,775,000 gal | 582.27 gpm<br>25,992,000 gal | 611.27 gpm<br>24,406,900 gal | 605.24 gpm<br>78,1739000 gal |
| Ads 101 - Flow                  | - Total              | 348.46 gpm<br>15,555,000 gal | 348.15 gpm<br>15,541,000 gal | 347.63 gpm<br>15,071,500 gal | 348.08 gpm<br>46,167,500 gpm |
| Ads 102 - Flow                  | - Total              | 0.00 gpm<br>0 gal            | 45.86 gpm*<br>2,047,000 gal  | 248.80 gpm<br>10,748,000 gal | 98.22 gpm<br>12,795,000 gal  |
| Ads 103 - Flow                  | - Total              | 273.73 gpm<br>12,220,000 gal | 188.26 gpm<br>8,404,000 gal  | 14.84 gpm^<br>614,300 gal    | 158.94 gpm<br>21,238,300 gal |

Note: \* Start up adsorber V-102. + Shutting down adsorber V-103. ^ Adsorber V-103 run while V-102 has a new meter installed.